

**Before the
Federal Communications Commission
Washington, D.C. 20554**

| | | |
|--|---|---------------------|
| In the Matter of |) | |
| |) | |
| Implementation of Section 6002(b) of the |) | |
| Omnibus Budget Reconciliation Act of 1993 |) | WT Docket No. 05-71 |
| |) | (Terminated) |
| Annual Report and Analysis of Competitive |) | |
| Market Conditions With Respect to Commercial |) | |
| Mobile Services |) | |

TENTH REPORT

Adopted: September 26, 2005

Released: September 30, 2005

By the Commission: Commissioner Copps concurring and issuing a statement.

TABLE OF CONTENTS

| Heading | Paragraph # |
|---|-------------|
| I. EXECUTIVE SUMMARY | 1 |
| II. INTRODUCTION | 6 |
| A. Background | 6 |
| B. Sources of Information | 9 |
| C. Structure of Report | 16 |
| III. MOBILE TELECOMMUNICATIONS MARKET STRUCTURE | 19 |
| A. Services and Product Market Definition | 21 |
| B. Overview of Service Providers | 25 |
| 1. Facilities-Based Mobile Telephone Providers | 25 |
| 2. Resale/MVNO Providers | 27 |
| 3. Data-Only Providers | 30 |
| 4. Satellite Providers | 35 |
| C. Horizontal Concentration | 36 |
| 1. Number of Mobile Telephone Competitors | 38 |
| 2. Concentration Measures for Mobile Telephone Services | 42 |
| 3. International Comparison of Mobile Market Concentration | 50 |
| D. Consolidation and Exit | 55 |
| 1. Sales and Swaps | 58 |
| 2. Affiliations | 63 |
| E. Entry Conditions and Potential Barriers to Entry | 67 |
| 1. Spectrum Allocation and Assignment | 68 |
| a. Cellular, Broadband PCS, and SMR | 69 |
| b. 800 MHz Band Reconfiguration and 1.9 GHz Spectrum Exchange | 75 |

| | |
|---|-----|
| c. Narrowband Spectrum | 76 |
| d. 700 MHz Bands | 78 |
| e. Advanced Wireless Services | 82 |
| f. Broadband Radio Service | 86 |
| 2. Other Potential Barriers to Entry | 91 |
| F. Rural Markets | 93 |
| 1. Geographical Comparisons: Urban vs. Rural | 93 |
| 2. Rural Competition | 94 |
| 3. Conclusion | 95 |
| IV. CARRIER CONDUCT IN THE MOBILE TELECOMMUNICATIONS MARKET | 96 |
| A. Price Rivalry | 97 |
| 1. Developments in Mobile Telephone Pricing Plans | 97 |
| 2. Prepaid Service | 99 |
| 3. Mobile Data Pricing | 101 |
| B. Non-Price Rivalry | 105 |
| 1. Technology Deployment and Upgrades | 106 |
| a. Overview | 106 |
| b. Background on Network Design and Technology | 109 |
| c. Technology Choices and Upgrades of Mobile Telephone Carriers | 113 |
| d. Coverage by Technology Type | 117 |
| e. Data-Only Networks and Technology Deployment | 120 |
| 2. Capital Expenditures | 127 |
| 3. Roaming | 128 |
| 4. Advertising and Marketing | 130 |
| 5. Quality of Service | 132 |
| 6. Mobile Data Services and Applications | 139 |
| V. CONSUMER BEHAVIOR IN THE MOBILE TELECOMMUNICATIONS MARKET | 145 |
| A. Access to Information on Mobile Telecommunications Services | 146 |
| B. Consumer Ability to Switch Service Providers | 148 |
| 1. Churn | 148 |
| 2. Local Number Portability | 150 |
| VI. MOBILE TELECOMMUNICATIONS MARKET PERFORMANCE | 153 |
| A. Pricing Levels and Trends | 154 |
| 1. Pricing Trends | 154 |
| 2. Average Revenue Per Unit | 159 |
| B. Quantity of Services Purchased | 160 |
| 1. Subscriber Growth | 160 |
| a. Mobile Telephony | 160 |
| b. Mobile Data | 165 |
| c. Satellite | 167 |
| 2. Minutes of Use | 168 |
| 3. Mobile Data Usage | 170 |
| 4. Sub-National Penetration Rates | 174 |
| C. Quality of Service | 176 |
| D. International Comparisons | 185 |
| 1. Mobile Voice | 185 |
| 2. Mobile Data | 192 |
| VII. INTERMODAL ISSUES | 195 |
| A. Wireless – Wireline Competition | 195 |
| 1. Wireless Substitution | 196 |
| 2. Wireless Alternatives | 199 |

| | |
|---------------------------------------|-----|
| B. Wireless Local Area Networks | 201 |
| VIII.CONCLUSION..... | 204 |
| IX. ADMINISTRATIVE MATTERS | 208 |
| APPENDIX A: Mobile Telephone Tables | |
| APPENDIX B: Maps | |
| APPENDIX C: List of NOI Commenters | |
| Statement of Commissioner Copps | |

I. EXECUTIVE SUMMARY

1. This report reviews competitive market conditions with respect to commercial mobile radio services (“CMRS”) using a framework that groups indicators of the status of competition into four categories: (1) market structure; (2) carrier conduct; (3) consumer behavior; and (4) market performance. The report also examines a number of related topics of interest to the Commission, including urban-rural and international comparisons, wireless-to-wireline competition, and Wireless Local Area Networks (“WLANs”). The report is retrospective, focusing on conditions prevailing in the CMRS marketplace as of the end of the 2004 calendar year and the first half of the 2005 calendar year.¹

2. In this report the Commission concludes that even with fewer nationwide mobile telephone carriers there is still effective competition in the CMRS marketplace. Among the indicators of market structure that support this conclusion, we note that 97 percent of the total U.S. population lives in counties with access to three or more different operators offering mobile telephone service, the same level as in the previous year, and up from 88 percent in 2000, the first year for which these statistics were kept. The percentage of the U.S. population living in counties with access to four or more and five or more different mobile telephone operators also remained roughly the same as in the previous year. In contrast, there was a sharp decline in the percentage of the U.S. population living in counties with access to six or more different mobile telephone operators as compared with the previous year, due largely to the acquisition of AT&T Wireless by Cingular Wireless. This transaction resulted in the first drop in the number of nationwide competitors since the Commission began compiling these reports. Nevertheless, although the mobile telephone market has become more concentrated as a result of the merger of two nationwide carriers, none of the remaining competitors has a dominant share of the market, and the market continues to behave and perform in a competitive manner.

3. With respect to carrier conduct, the record indicates that competitive pressure continues to compel carriers to introduce innovative pricing plans and service offerings, and to match the pricing and service innovations introduced by rival carriers. Price rivalry is evidenced by the proliferation of “family plan” offerings, and by the introduction of a variety of new prepaid plans, or entirely new brands (such as “Boost Mobile”), targeted at previously untapped segments of the market. The result has been a significant increase in the percentage of wireless users who subscribe to prepaid plans in the past year. In addition, the deployment of next-generation networks based on competing technological standards continues to be an important dimension of non-price rivalry in the U.S. mobile telecommunications market. Both Sprint and Cingular appear to be making a concerted effort to match the mobile broadband service which Verizon Wireless launched in late 2003 and now offers in a number of major U.S. cities. To this end, in July 2005 Sprint began to deploy the same CDMA2000 1xEV-DO network technology that Verizon Wireless uses, whereas Cingular Wireless is planning to deploy UMTS (or WCDMA) with HSDPA (High Speed Data Packet Access) technology in a number of major U.S. markets by the end of 2005. In addition to investing in network deployment and upgrades, carriers have continued to pursue strategies designed to differentiate their brands from rival offerings based on attributes such as network coverage and service quality. A notable example of such an attempt at brand differentiation in the past year was T-Mobile’s introduction of an interactive “Personal Coverage Check” feature to its Web site which enables customers to check the quality of network coverage where they live and work before they purchase service.

4. Consumers continue to pressure carriers to compete on price and other terms and

¹ Consequently, while the report acknowledges that the Sprint-Nextel and Alltel-Western Wireless mergers have occurred, these transactions closed too recently for their effects to be reflected in the indicators of market structure, carrier conduct, and market performance. However, the structural changes resulting from these transactions, and their potential impact on carrier conduct and market performance, will be reflected in future reports.

conditions of service by freely switching providers in response to differences in the cost and quality of service. Monthly churn rates average about 1.5 to 3.0 percent per month, a slight decline from the previous year. In addition, the implementation of local number portability ("LNP") beginning in November 2003 has lowered consumer switching costs by enabling wireless subscribers to keep their phone numbers when changing wireless providers. While the advent of LNP has not resulted in an increase in churn, analyst reports continue to suggest that LNP has put added pressure on carriers to improve service quality in order to retain existing customers and to avoid increased churn.

5. Indicators of market performance show that competition continues to afford many significant benefits to consumers. In the 12 months ending December 2004, the United States mobile telephone sector increased subscribership from 160.6 million to 184.7 million, raising the nationwide penetration rate to approximately 62 percent of the population. Mobile subscribers continued to increase the amount of time they spend talking on their mobile phones, with average minutes of use per subscriber per month rising to more than 580 minutes in the second half of 2004 from 507 minutes in 2003 and 427 minutes in 2002. Moreover, although U.S. mobile subscribers still prefer to use their mobile phones to talk rather than to send text messages ("SMS"), the volume of SMS traffic grew to 4.7 billion per month in December 2004, more than double the 2 billion messages per month reported in December 2003. Evidence on mobile pricing trends remains somewhat mixed, with two different indicators of mobile pricing - revenue per minute and the cellular Consumer Price Index ("CPI") - continuing to show a decline in the price of mobile telephone service, and a third indicator based on the consumption patterns of hypothetical users showing a slight increase in the cost of mobile service in 2004. Nevertheless, international comparisons indicate that mobile voice calls are still far less expensive on a per minute basis in the United States than in Western Europe.

II. INTRODUCTION

A. Background

6. In 1993, Congress created the statutory classification of Commercial Mobile Services² to promote the consistent regulation of mobile radio services that are similar in nature.³ At the same time, Congress established the promotion of competition as a fundamental goal for CMRS policy formation and regulation. To measure progress toward this goal, Congress required the Federal Communications Commission ("FCC" or "Commission") to submit annual reports that analyze competitive conditions in the industry.⁴ This report is the tenth of the Commission's annual reports⁵ on the state of CMRS

² Commercial Mobile Services came to be known as the Commercial Mobile Radio Services, or "CMRS." CMRS includes a large number of terrestrial services and some mobile satellite services. See 47 C.F.R. § 20.9(10).

³ The Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, Title VI, § 6002(b), amending the Communications Act of 1934 and codified at 47 U.S.C. § 332(c). As in the past, this report bases its analysis on a consumer-oriented view of wireless services by focusing on specific product categories, regardless of their regulatory classification. In some cases, this includes an analysis of offerings outside the umbrella of "services" specifically designated by the Commission as CMRS. However, because providers of these other services can compete with CMRS providers, the Commission believes that it is important to consider them in the analysis. As the Commission said, paraphrasing the Department of Justice/Federal Trade Commission guidelines on merger review, "When one product is a reasonable substitute for the other in the eyes of consumers, it is to be included in the relevant product market even though the products themselves are not identical." Application of Echostar Communications Corporation, General Motors Corporation, and Hughes Electronics Corporation (Transferors) and Echostar Communications Corporation (Transferee), *Hearing Designation Order*, 17 FCC Rcd 20559, 20606 (2002).

⁴ 47 U.S.C. § 332(c)(1)(C).

⁵ See Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *First Report*, 10 FCC (continued....)

competition.⁶

7. The statute requiring the annual report on CMRS competition states,

The Commission shall review competitive market conditions with respect to commercial mobile services and shall include in its annual report an analysis of those conditions. Such analysis shall include an identification of the number of competitors in various commercial mobile services, an analysis of whether or not there is effective competition, an analysis of whether any of such competitors have a dominant share of the market for such services, and a statement of whether additional providers or classes of providers in those services would be likely to enhance competition.⁷

8. With the *Tenth Report*, we continue to comply with each of the four statutory requirements for analyzing competitive market conditions with respect to commercial mobile services. As in previous reports, we base our analysis of competitive market conditions on a range of standard indicators commonly used for the assessment of effective competition. Beginning with the *Ninth Report*, we have reorganized the presentation of the various indicators to conform to a framework that groups such indicators into four distinct categories (A) Market Structure, (B) Carrier Conduct, (C) Consumer Behavior, and (D) Market Performance.⁸ This framework provides a systematic approach to addressing the four statutory requirements. For example, Section III on market structure identifies the number of competitors in various commercial mobile services, and it also uses subscriber market shares to measure concentration in mobile telephone markets. In addition, Section III tracks the entry of additional providers or classes of providers in commercial mobile services, and more generally provides an analysis

(Continued from previous page) —————

Rcd 8844 (1995) (“*First Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Second Report*, 12 FCC Rcd 11266 (1997) (“*Second Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Third Report*, 13 FCC Rcd 19746 (1998) (“*Third Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fourth Report*, 14 FCC Rcd 10145 (1999) (“*Fourth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fifth Report*, 15 FCC Rcd 17660 (2000) (“*Fifth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Sixth Report*, 16 FCC Rcd 13350 (2001) (“*Sixth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Seventh Report*, 17 FCC Rcd 12985 (2002) (“*Seventh Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Eighth Report*, 18 FCC Rcd 14783 (2003) (“*Eighth Report*”); Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Ninth Report*, 19 FCC Rcd 20597 (2004) (“*Ninth Report*”). The reports can also be found on the FCC’s website at <<http://wireless.fcc.gov/cmrs-crforum.html>>.

⁶ This report, like the others before it, discusses CMRS as a whole because Congress called on the Commission to report on “competitive market conditions with respect to commercial mobile services.” 47 U.S.C. § 332(c)(1)(C). Any individual proceeding in which the Commission defines relevant product and geographic markets, such as an application for approval of a license transfer, may present facts pointing to narrower or broader markets than any used, suggested, or implied in this report.

⁷ 47 U.S.C. § 332 (c)(1)(C).

⁸ *Ninth Report*, at 20602-20603 and 20607.

of the conditions affecting the ability of additional providers or classes of providers to enter the market for commercial mobile services. The framework also clarifies that indicators of market structure such as the number of competitors and their market shares are not, by themselves, a sufficient basis for determining whether there is effective competition, and whether any of the competitors have a dominant share of the market for commercial mobile services. Rather, we make these determinations based on an analysis of both the structural and the behavioral characteristics of the CMRS marketplace.

B. Sources of Information

9. The Commission has expanded its efforts to improve the quality and granularity of the data used to examine competition in the CMRS industry. In February 2005, the Wireless Telecommunications Bureau (“Bureau”) released a Public Notice (“Tenth CMRS PN”) seeking data and information on the status of competition in the CMRS industry.⁹ The Bureau requested data based on several metrics, including subscribership, penetration rates, market shares, usage, average revenue per unit (“ARPU”), pricing, quality of service, and service availability. In order to enhance our analysis of CMRS service availability and competition, the Bureau invited service providers to submit their coverage maps in an electronic, mapable format and to distinguish between the areas where they offer coverage to subscribers and the areas where they market service to new customers. Furthermore, the *Tenth CMRS PN* asked for information on the deployment of next-generation network technologies, the competitive impact of resale providers, pricing and competition in rural markets, the availability of roaming, the effect of local number portability on consumer churn, and wireless-to-wireline competition.

10. Thirteen parties submitted comments or reply comments in response to the *Tenth CMRS PN*.¹⁰ Some commenters stated that the CMRS marketplace remains competitive.¹¹ One commenter further contended that there is significant wireless competition in rural areas, and that rural customers receive the same benefits of competition as urban customers.¹² Other commenters provided input on the extent to which Mobile Virtual Network Operators (“MVNOs”) and resellers compete in the CMRS industry.¹³ In general, however, commenters submitted little new data relating to the various metrics used to assess competitive market conditions with respect to CMRS. Moreover, service providers did not submit maps of their coverage areas or distinguish between areas where they provide coverage and areas where they market service.

11. Prior to the *Seventh Report*, the Commission based its analysis of competition in the CMRS industry solely on numerous publicly-available sources of data on the industry. These sources included: company filings with the Securities and Exchange Commission (“SEC”), data compiled and released by trade associations and by other government agencies, reports by securities analysts and other

⁹ WTB Seeks Comment on CMRS Market Competition, WT Docket No. 05-71, *Public Notice*, 20 FCC Rcd 4073 (2005) (“*Tenth CMRS PN*”). See also, Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No. 04-111, *Notice of Inquiry*, 19 FCC Rcd 5608 (2004) (“*Ninth CMRS NOI*”); Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No. 02-379, *Notice of Inquiry*, 17 FCC Rcd 24923 (2002) (“*Eighth CMRS NOI*”).

¹⁰ See Appendix C, *infra*, for a list of parties that filed comments in response to the *Tenth CMRS PN*.

¹¹ See CTIA-The Wireless Association, *PN Comments*, at ii, 2-3 (filed Mar. 28, 2005) (“CTIA Comments”); T-Mobile USA, Inc., *PN Reply Comments*, at 1-2 (filed Apr. 12, 2005) (“T-Mobile Reply Comments”).

¹² T-Mobile Reply Comments, at 6.

¹³ Tracfone Wireless, Inc., *PN Comments*, at 3 (filed Mar. 29, 2005) (“Tracfone Comments”); Virgin Mobile USA, LLC, *PN Reply Comments*, at 5 (filed Apr. 12, 2005) (“Virgin Mobile Reply Comments”).

research companies and consultants, company news releases and web sites, newspaper and periodical articles, and the Commission's Universal Licensing System ("ULS") database. In the *Seventh Report*, the Commission added two new sources of information: the Numbering Resource Utilization / Forecast ("NRUF") database, described below, and information submitted at a Public Forum held at the Commission in February 2002.¹⁴ Nevertheless, we continue to rely primarily on the aforementioned publicly-available sources and believe that they, when taken together, allow us to analyze the extent of competition in the industry on a nationwide basis. Because many of these publicly-available sources report national averages that reflect trends in the nation as a whole or in urban markets, they may provide limited insight into the extent of competition in particular geographic markets, including markets located in rural areas. The NRUF data have enabled us to conduct a more granular analysis of competition on a regional level and also to compare competitive conditions in urban and rural areas.

12. In order to further uphold the integrity of our data on CMRS competition, we include, in many places, multiple data sources to report on the same metric or depict the same trend. For example, this report and previous reports have included data from three separate sources – the U.S. Department of Commerce Bureau of Labor Statistics ("BLS"); economic research and consulting firm, Econ One; and the CTIA - The Wireless Association ("CTIA") – on the average price of mobile telephone service.¹⁵ In addition to using multiple sources for many metrics, we also emphasize that some of the sources upon which we rely, particularly SEC filings, are required by law to be accurate, and are scrutinized by independent third parties. The CTIA metrics used in the report are compiled and aggregated by an independent third party in a manner that protects carrier confidentiality, provides an incentive for carrier participation, and maintains the integrity of the results.¹⁶ Furthermore, other carrier-reported data included in the report, such as coverage maps, are subject to contractual obligations with customers. Because all carrier-reported data are compiled by the carriers themselves and typically released in the aggregate to protect confidentiality, we are unable to have in-depth knowledge of the minutia of such data. However, we believe it is appropriate to use these sources in our analysis of CMRS competition for the reasons stated above.

13. As mentioned above, the *Seventh Report* integrated a new source of data collected through an FCC order, the NRUF database.¹⁷ The NRUF data tracks phone number usage by all telecommunications carriers, including wireless carriers, in the United States. All mobile wireless carriers must report to the FCC the quantity of their phone numbers that have been assigned to end users, thereby

¹⁴ The Public Forum was held in order to examine ways in which to better gather and analyze data for the CMRS Competition Reports, in particular data regarding the development of competition in rural and underserved areas. See Wireless Telecommunications Bureau Announces Agenda and Speakers For Public Forum For The 7th Annual Commercial Mobile Radio Services Competition Report, *Public Notice*, DA 02-422 (rel. Feb. 25, 2002). See FCC, *Commercial Mobile Radio Services (CMRS) Competition Report Public Forum*, <<http://wireless.fcc.gov/cmrs-crforum.html>> for access to participants' presentations and forum transcript. The direct link to the forum transcript is <<http://wireless.fcc.gov/services/cmrs/presentations/020228.pdf>> ("*Transcript*"). Forum participants not only provided additional data, including data on the average price of mobile telephone service in rural areas, but also presented suggestions on how to analyze data more effectively. Research organizations and agencies offered insight into the methodologies they use to gather and analyze data, and the wireless carriers offered anecdotes on the competitive pressures that their companies face. The Commission incorporated these data, suggestions, and insights into the *Seventh Report*.

¹⁵ See Section VI.A.1, Pricing Trends, *infra*.

¹⁶ See CTIA, *Wireless Industry Indices: Semi-Annual Data Survey Results* (results through December 2004) ("*Dec 2004 CTIA Survey*"). See note 396, *infra*, for a discussion of data reported by CTIA.

¹⁷ See Section VI.B.1, Subscriber Growth, *infra*, for a further discussion of NRUF data. Carriers submit the data to NeuStar, Inc., who consolidate the data into a database and supply it to the Commission upon request.

permitting the Commission to make an accurate estimate of the total number of mobile subscribers. As in the *Seventh Report*, we continue to use the NRUF data to determine the total number of mobile telephone subscribers and paging subscribers.¹⁸ In addition, because we collect NRUF data on a small, rate center area basis,¹⁹ we can use this information to estimate mobile telephone subscribership levels and penetration rates on a regional basis in addition to a national basis. In the *Seventh Report*, the Commission therefore began reporting mobile telephone penetration rates on an Economic Area (“EA”) basis and continues to report them in this manner in this report.²⁰ Finally, beginning with the *Ninth Report*, we used NRUF data to measure market concentration on an EA basis.²¹ In particular, the subscriber market shares we use to calculate the Herfindahl-Hirschman Index (“HHI”) for EAs are based on NRUF data.²² However, although we are using EAs to calculate both sub-national penetration levels and HHIs for the purposes of this report, this does not mean that we find the EA to be a relevant geographic market for other purposes.

14. One of the most important metrics that the Commission has tracked since 1995 is the number of facilities-based mobile telephone carriers providing service in a particular geographic area.²³ To track service launches by broadband Personal Communications Services (“broadband PCS” or “PCS”) and Specialized Mobile Radio (“SMR”) operators, the Commission has analyzed publicly-available information released by the operators, such as news releases, filings with the SEC, coverage maps available on operators’ Internet sites, and filings with the Commission. The Commission has based its analysis of cellular coverage on cellular licensees’ service area boundary maps, which are filed with the Commission. The Commission began tracking service launches on a BTA-by-BTA²⁴ basis in 1995, but switched to the more detailed, county-by-county basis in the *Fifth Report* in an effort to improve accuracy and significantly reduce the level of overcounting.²⁵ It has derived from these data the number of competitors operating in every U.S. county and hence the percentage of the U.S. population living in

¹⁸ See *Seventh Report*, at 13005, 13049.

¹⁹ Rate centers are small geographic areas used by local exchange carriers for a variety of reasons, including the determination of toll rates. See Harry Newton, *NEWTON’S TELECOM DICTIONARY: 16TH EXPANDED & UPDATED EDITION*, CMP Books, July 2000, at 732. Urban rate centers are generally smaller than rural rate centers. The smallest rate centers are a few square miles in size, while some rural rate centers are hundreds of square miles in size. Rate centers are generally smaller than counties: there are roughly 18,000 rate centers in the United States, compared to roughly 3,200 counties.

²⁰ *Seventh Report*, at 13005; See Section VI.B.4, Sub-National Penetration Rates, *infra*.

²¹ *Ninth Report*, at 20618-20620.

²² The HHI is calculated by summing the squares of the individual market shares of all firms competing in the relevant market. See Section III.C.2, Concentration Measures for Mobile Telephone Services, *infra*.

²³ See Section III.C.1, Number of Mobile Telephone Competitors, *infra*.

²⁴ Basic Trading Areas (“BTAs”) are Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an agreement with the Federal Communications Commission. BTAs are geographic areas drawn based on the counties in which residents of a given BTA make the bulk of their shopping goods purchases. Rand McNally’s BTA specification contains 487 geographic areas covering the 50 states and the District of Columbia. For its spectrum auctions, the Commission added additional BTA-like areas for: American Samoa; Guam; Northern Mariana Islands; San Juan, Puerto Rico; Mayagüez/Aguadilla-Ponce, Puerto Rico; and the U.S. Virgin Islands.

²⁵ BTAs can be sub-divided into counties. The United States is made up of approximately 3,200 counties versus 493 BTAs.

areas with a certain number of competitors.²⁶ These data have also been used to derive the percentage of the U.S. population living in counties with digital coverage. As mentioned in previous reports, there are several important caveats to note when considering the data. First, to be considered as “covering” a county, an operator need only be offering any service in a portion of that county. Second, multiple operators shown as covering the same county are not necessarily providing service to the same portion of that county. Third, the figures for POPs²⁷ and land area in this analysis include all of the POPs and every square mile in a county considered to have coverage. Therefore, our analysis overstates to some unknown and unavoidable degree the total coverage in terms of both geographic areas and population covered. On the other hand, we believe our analysis to be the most accurate in the industry today given the coverage data that are publicly available.

15. Another more general limitation of the Commission’s analysis of the number of facilities-based mobile telephone carriers providing service in a particular geographic area is that it does not account for differences in the market shares of mobile telephone carriers. As indicated above, however, the analysis of the number of mobile telephone carriers is supplemented with the measurement of concentration using HHIs calculated based on subscriber market shares for EAs. The value of HHI reflects both the number of market competitors and the distribution of their market shares.

C. Structure of Report

16. As noted above, the structure of the *Tenth Report* conforms to a framework that groups the indicators of competitive market conditions into four distinct categories (A) Market Structure, (B) Carrier Conduct, (C) Consumer Behavior, and (D) Market Performance. The section on market performance evaluates the outcomes of competitive conditions in the CMRS industry from the consumer’s point of view, focusing on the benefits to consumers of competition such as lower prices, higher quality, greater variety, and more rapid innovation. In contrast, the sections on market structure, carrier conduct, and consumer behavior examine the various structural and behavioral determinants of such market outcomes.

17. In using this framework to analyze competitive market conditions with respect to commercial mobile radio services, we have integrated the discussion and analysis of mobile voice and mobile data services within each of the four categories of indicators. As stated in previous reports, mobile voice and mobile data services are no longer clearly delineated in the marketplace.²⁸ Many mobile voice operators also offer mobile data services using the same spectrum, network facilities, and customer equipment. Furthermore, many U.S. mobile carriers have integrated the marketing of mobile voice and data services. For these reasons, we find it reasonable to analyze competitive conditions with respect to these services together.²⁹ As in previous reports, we continue to identify, and to distinguish from such integrated mobile carriers, mobile data providers that offer only mobile data services, instead of both voice and data services, including those providers that offer such data-only services on networks distinct

²⁶ For a complete list of cellular and PCS licenses on a county-by-county basis, see FCC Wireless Telecommunications Bureau, *Broadband PCS Data*, <<http://wireless.fcc.gov/services/broadbandpcs/data/>>; FCC Wireless Telecommunications Bureau, *Cellular Services Data*, <<http://wireless.fcc.gov/services/cellular/data/>>.

²⁷ POPs is an industry term referring to population, usually the number of people covered by a given wireless license or footprint. One “POP” equals one person.

²⁸ See *Eighth Report*, at 14792.

²⁹ Although we integrate the analysis of mobile voice and data services for the reasons indicated here, below we define separate product markets for mobile voice services and mobile data services. See Section III.A, Services and Product Market Definition, *infra*. Accordingly, our integration of the analysis of mobile voice and data services in the context of this report should not be taken as an indication that the Commission will consider mobile voice and data services as belonging in the same product market in a different context.

from those traditionally used to provide mobile voice. However, we analyze competitive conditions with respect to the services provided by integrated mobile carriers and data-only providers together, rather than treating mobile data services and data-only service providers in a separate section of the report.

18. As in previous reports, the *Tenth Report* includes an analysis of wireless-to-wireline competition. However, since such “intermodal” competition is distinct from “intra-modal” competition among the various wireless carriers, we have placed our analysis of wireless-to-wireline competition in a separate section on intermodal issues (Section VII), following the sections on market structure, carrier conduct, consumer behavior and market performance within the CMRS industry. In addition to the analysis of wireless-to-wireline competition, Section VII also provides a brief discussion of Wireless Local Area Networks, or WLANs. Although both CMRS and WLAN services are wireless services, WLAN services are based on a different wireless technology and spectrum model than CMRS, and they have the potential to act as a substitute as well as a complement to data services offered over mobile telephone networks.

III. MOBILE TELECOMMUNICATIONS MARKET STRUCTURE

19. The analysis in this section covers two distinct aspects of mobile telecommunications market structure. The first is the current level of horizontal concentration as reflected in the number of carriers competing in the various mobile service markets and their respective market shares. The second is the ease or difficulty of entry into the various mobile service markets, with particular emphasis on the way spectrum allocation and availability affect entry conditions and barriers to entry.

20. As background to the discussion of horizontal concentration and entry conditions, Sections III.A and III.B provide an overview of the various types of CMRS services and service providers. Following the analysis of the current level of horizontal concentration in Section III.C, Section III.D examines recent or impending transactions that affect, or have the potential to affect, the level of horizontal concentration. Section III.E examines entry conditions. The final section, III.F, addresses structural differences between rural and non-rural mobile telecommunications markets in the United States.

A. Services and Product Market Definition

21. Since CMRS encompasses a variety of terrestrial and satellite services, an important initial step in analyzing the structure of the mobile telecommunications market is to define the relevant product market for each of these services. The basic economic principle for defining the scope of the relevant product market is to include two mobile services in the same product market if they are essentially interchangeable from the perspective of most consumers – that is, if consumers view them as close substitutes. For the purposes of this report, relatively narrow product market definitions will be used, with a separate product market identified for each of the following services: interconnected mobile voice; interconnected mobile data; and mobile satellite service. However, the identification of separate markets for each service in the context of this report does not preclude the possibility that, in a different context, the Commission may find that two or more of these services belong in the same product market. The Commission may also find that certain types of mobile voice or data services (for example, nationwide calling plans, paging services) constitute a separate relevant product market, or that consumer demand for bundled packages of interconnected mobile voice and mobile data services make it appropriate to define one or more separate markets for bundled mobile services.

22. This report defines the mobile telephone sector to include all operators that offer commercially available, interconnected mobile voice services. These operators provide access to the public switched telephone network (“PSTN”) via mobile communication devices employing radiowave technology to transmit calls. As discussed below, providers using cellular radiotelephone, broadband

PCS, and SMR licenses account for most of this sector.³⁰

23. For purposes of this report, mobile data service is considered to be the delivery of non-voice information to a mobile device. Two-way mobile data services include not only the ability to receive non-voice information on an end-user device but to send it from an end-user device to another mobile or landline device using wireless technology. The mobile data services currently available include paging, text messaging (also called short messaging service, or “SMS”), multimedia messaging services (“MMS”) such as exchanging digital photos, information alerts, entertainment applications such as ringtones and games, web browsing, e-mail, access to files stored on corporate servers, and wireless telemetry.³¹

24. Any mobile satellite service (“MSS”) that involves the provision of commercial mobile radio service directly to end users is by statutory definition CMRS.³² As detailed in the *Eighth Report*, the Commission permits MSS providers in the 2 GHz,³³ Big LEO,³⁴ and L-Band³⁵ frequency bands to provide an ancillary terrestrial component (“ATC”) to their satellite systems, provided that the MSS licensee: (1) has launched and operates its own satellite facilities; (2) provides substantial satellite service to the public; (3) provides integrated ATC; (4) observes existing satellite geographic coverage requirements; and (5) limits ATC operations only to the authorized satellite footprint.³⁶ The *Satellite Flexibility Order* noted that, since terrestrial CMRS and MSS ATC are expected to have different prices, coverage, product acceptance and distribution, the two services appear, at best, to be imperfect substitutes for one another that would be operating in predominately different market segments.³⁷ The Commission has granted one application to add ATC to MSS satellite offerings, to Mobile Satellite Ventures (“MSV”) in the L-Band.³⁸

B. Overview of Service Providers

1. Facilities-Based Mobile Telephone Providers

25. As of June 2005, there were five mobile telephone operators in the United States that

³⁰ See 47 C.F.R. §§ 22.900, 24.200, 90.601.

³¹ Wireless telemetry is the use of wireless technology to monitor mobile or fixed equipment in a remote location, such as the remote monitoring of utility meters by utility and energy companies. See *Eighth Report*, at 14864-14865.

³² 47 C.F.R. § 20.9(10). This rule section also contains an exception for “mobile satellite licensees and other entities that sell or lease space segment capacity, to the extent that it does not provide commercial radio service directly to end users.” The exception permits such entities to provide space segment capacity to commercial mobile radio service providers on a non-common carrier basis, if authorized by the Commission.

³³ The 2 GHz MSS band refers to the 2000-2020 MHz uplink (Earth-to-space transmissions) and 2180-2200 MHz downlink (space-to-Earth transmissions) frequencies.

³⁴ The Big LEO (low-earth orbit) band MSS allocation consists of an uplink at 1610-1626.5 MHz and a downlink at 2483.5-2500 MHz and is sometimes referred to as the 1.6/2.4 GHz band.

³⁵ The L-Band has MSS allocations at 1525-1559 MHz (downlink) and 1626.5-1660.5 MHz (uplink).

³⁶ See Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, *Report and Order and Notice of Proposed Rulemaking*, 18 FCC Rcd 1962, 1964 (2003) (“*Satellite Flexibility Order*”).

³⁷ *Satellite Flexibility Order*, at 1984.

³⁸ Mobile Satellite Ventures Subsidiary LLC, *Order and Authorization*, 19 FCC Rcd 22144 (Int’l Bur. 2004).

analysts typically describe as nationwide: Sprint PCS,³⁹ Verizon Wireless, LLC (“Verizon Wireless”),⁴⁰ T-Mobile,⁴¹ Cingular Wireless, LLC (“Cingular Wireless” or “Cingular”),⁴² and Nextel. When an operator is described as being “nationwide,” it does not necessarily mean that the operator’s license areas, service areas, or pricing plans cover the entire land area of the United States. The five mobile telephone carriers that analyst reports typically describe as nationwide all offer facilities-based service in at least some portion of the western, midwestern, and eastern United States. In addition, each of the five national operators has networks covering at least 200 million people, while the next largest provider covers less than 62 million people.⁴³ In addition to the nationwide operators, there are a number of large regional players, including ALLTEL Corp. (“ALLTEL”),⁴⁴ United States Cellular Corp. (“US Cellular”), and Dobson Communications (“Dobson”).

26. Because the five nationwide mobile telephone operators as well as the large regional and numerous other smaller operators have different geographic footprints, they do not all compete head-to-head in each and every region and locality of the country. To provide an accurate count of the number of competitors in the market for mobile telephone services in compliance with the statutory requirement, it is necessary as an initial step to define the scope of the geographic market more narrowly on a regional or local basis. For example, Section III.C.1 below identifies the number of mobile telephone competitors on a county-by-county basis.

2. Resale/MVNO Providers

27. Resellers offer service to consumers by purchasing airtime at wholesale rates from facilities-based providers and reselling it at retail prices.⁴⁵ Resellers today are often referred to as MVNOs (Mobile Virtual Network Operators). One commenter argued that “resold CMRS service can provide significant competition to traditional wireless operators provided that the resold service differentiates itself from the offerings of the large, national carriers.”⁴⁶ According to information provided

³⁹ Sprint PCS is a division of Sprint Corp. (“Sprint”). See Sprint Corp., SEC Form 10-K/A, Apr. 29, 2005.

⁴⁰ Verizon Wireless is a joint venture of Verizon Communications, Inc. (“Verizon”) and Vodafone Group PLC (“Vodafone”). Verizon owns 55 percent of Verizon Wireless, and Vodafone owns 45 percent. See Verizon Communications, Inc., SEC Form 10-K, Mar. 14, 2005, at 12.

⁴¹ T-Mobile USA, formerly known as VoiceStream Wireless Corp., is a wholly-owned subsidiary of Deutsche Telekom AG (“Deutsche Telekom”).

⁴² Cingular Wireless is a joint venture of SBC Communications, Inc. (“SBC”) and BellSouth Corporation (“BellSouth”). See *Sixth Report*, at 13363-64.

⁴³ *Wireless 411*, at 11.

⁴⁴ Due to its large customer base but limited geographical scope, some analysts refer to ALLTEL as a “super-regional.” See, e.g., Dan Meyer, *ALLTEL to pick up Western Wireless for \$6 billion*, RCR WIRELESS NEWS, Jan. 17, 2005, at 1 (“Merger-mania trickled down the food chain last week as super-regional operator Alltel Corp. said it had reached an agreement to buy rural operator Western Wireless Corp. for approximately \$6 billion”). In addition, ALLTEL has a very low roaming rate with Verizon Wireless which allows it to offer customers attractive national rate plans. Phil Cusick and Richard Choe, *Wireless 101: A U.S. Wireless Industry Primer*, Bear Stearns Equity Research, June 2005, at 60. One analyst reports that “ALLTEL believes customers view their business as ‘national’ because of their national roaming agreement with Verizon.” Simon Flannery and Jessica Yau, *ALLTEL Corporation, Conference Takeaways: On Track with Western Deal*, Morgan Stanley, Equity Research, May 5, 2005, at 1.

⁴⁵ Interconnection and Resale Obligations Pertaining to Commercial Mobile Radio Services, *First Report and Order*, 11 FCC Rcd 18455, 18457 (1996).

⁴⁶ Virgin Mobile Reply Comments, at 4-5.

to the FCC in its ongoing local competition and broadband data gathering program, the resale sector accounts for approximately 9 percent of all mobile telephone subscribers, a 50 percent increase from 2003.⁴⁷ In addition, most MVNO customers are on prepaid plans.⁴⁸ According to one analysis, MVNOs served as many prepaid subscribers in 2004 as facilities-based carriers offering their own carrier-branded prepaid offerings.⁴⁹

28. With the exception of TracFone Wireless Inc., which serves approximately 4.5 million customers with prepaid offerings,⁵⁰ there are few large, independent⁵¹ resellers of wireless service. However, the interest in resale, particularly prepaid-only ventures, is growing.⁵² Virgin Mobile USA ("Virgin Mobile"), a joint venture between Sprint PCS and Richard Branson's Virgin Group, LLC, was launched in July 2002, targeting its prepaid offerings at the youth market.⁵³ The venture now serves more than three million subscribers.⁵⁴ Qwest Corporation ("Qwest"), having decided to exit the facilities-based provision of wireless service in 2003, now resells Sprint PCS services under its own brand name.⁵⁵ AT&T Corp, former owner of AT&T Wireless, announced plans in 2004 to reenter the mobile telephone market through resale of Sprint PCS services.⁵⁶ In February 2005, a new venture, Movida Communications, announced plans to target the growing population of Hispanic consumers in the US through an MVNO arrangement (also with Sprint PCS).⁵⁷ In March 2005, U.S. Internet service provider EarthLink and South Korea's SK Telecom announced a wireless resale venture, SK-EarthLink, focusing on customers with data-intensive needs.⁵⁸ Time-Warner, Disney, 7-Eleven, and Wal-Mart have either announced plans to launch, or are considering launching, their own MVNOs.⁵⁹ There is even a MVNO,

⁴⁷ See Appendix A, Table 2, *infra*; *Ninth Report*, at 20614.

⁴⁸ Jason Armstrong, *et al.*, *Shades of Grey in Prepaid*, Goldman Sachs, Equity Research, Apr. 12, 2005, at 11 (footnote 2 in Exhibit 6: 4Q2004 net addition analysis).

⁴⁹ COMMUNICATIONS DAILY, Jun. 5, 2005, at 8 (citing a study by Atlantic-ACM).

⁵⁰ TracFone Comments, at 2.

⁵¹ That is, without an equity interest from a facilities-based carrier.

⁵² See Section IV.A.2, Prepaid Service, *infra*, discusses some of the reasons for this increased interest.

⁵³ See Virgin Mobile Reply Comments, at 1. For a detailed discussion of the venture, see *Seventh Report*, at 13026.

⁵⁴ Virgin Mobile Reply Comments, at 2.

⁵⁵ See *Ninth Report*, at 20627-20628.

⁵⁶ *Ninth Report*, at 20615. SBC's attempt to acquire AT&T, plus AT&T's decision to no longer market to consumers, might change those plans. John Byrne, *Wireless Industry '05: Fewer Networks, More Labels*, KAGAN WIRELESS MARKET STATS, Jan. 31, 2005, at 2; Frank J. Governali *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, Aug. 27, 2004, at 4.

⁵⁷ Simon Flannery *et al.*, *Prepaid Wireless: Revisiting a Diamond in the Rough*, Morgan Stanley Equity Research, Apr. 6, 2005, at 9 ("Diamond in the Rough").

⁵⁸ *Korea's SK Telecom, Earthlink Form U.S. Venture*, REUTERS, Mar. 25, 2005; John Byrne, *Wireless Industry '05: Fewer Networks, More Labels*, KAGAN WIRELESS MARKET STATS, Jan. 31, 2005, at 2.

⁵⁹ John Byrne, *Wireless Industry '05: Fewer Networks, More Labels*, KAGAN WIRELESS MARKET STATS, Jan. 31, 2005, at 2. See, also, Sinead Carew, *Virgin Making Mark Among Mobile Services*, REUTERS, Oct. 2, 2004. In July 2005, Disney and Sprint announced an agreement to launch a family-oriented MVNO on Sprint PCS' network, to be called "Disney Mobile." The service, aimed at "the unique communication needs of families," is planned for launch in 2006. *Sprint, Disney will offer wireless service for families*, BIZJOURNALS.COM, July 6, 2005. In December 2004, ESPN, which is majority-owned by Disney, announced a similar deal with Sprint, targeting sports fans with sports (continued....)

Firefly Mobile, aimed at families with 8- to 12-year old children.⁶⁰

29. In addition, Nextel's is targeting the teenage market through a subsidiary, using an alternative prepaid brand, "Boost Mobile."⁶¹ As of Dec. 31, 2004, Nextel had 1.2 million subscribers on Boost Mobile prepaid plans.⁶²

3. Data-Only Providers

30. In addition to the voice and data services offered by mobile telephone carriers, other providers, including those using BRS/EBS spectrum and paging/messaging carriers, offer or are preparing to offer a range of mobile broadband and narrowband data services.

31. In August 2004, Clearwire, a wireless broadband company led by Craig McCaw, launched mobile broadband service in Jacksonville, FL using BRS and leased EBS spectrum in the 2.5 GHz band. The company has since expanded service to twelve additional markets and plans to roll out service to four new markets in the near future.⁶³ The service provides consumers wireless broadband Internet access at downstream speeds ranging from 512 kbps to 1.5 Mbps using a "plug-and-play" wireless modem device connected directly to a desktop or laptop computer.⁶⁴ Customers can transport the devices to other locations within Clearwire's coverage area where a network signal is available and in some cases use them while traveling at high speeds.⁶⁵ Clearwire is using Orthogonal Frequency Division Multiplexing (OFDM) technology developed and manufactured by its equipment subsidiary, NextNet Wireless, and spectrum in the 2.5 GHz BRS/EBS band.⁶⁶ As discussed in Section IV.B.1.e, Clearwire

(Continued from previous page) —————

content on their ESPN-branded wireless phones. Jesse Drucker and Merissa Marr, *Disney to Enter Cellphone Market, With Kids in Mind*, WALL STREET JOURNAL, July 6, 2005, at D5.

⁶⁰ John Byrne, *Kagan Ups Wireless Data Forecast*, KAGAN WIRELESS TELECOM INVESTOR, Jun. 6, 2005, at 1. Firefly is selling the device with prepaid service through Suncom Wireless and Cincinnati Bell Wireless. The company also sells it on their Web site for \$100 (with 30 prepaid minutes). Target stores began selling Firefly in the summer of 2005 with service from Cingular. Gary Krakow, *This isn't Your Father's Cell Phone*, MSNBC.COM, Mar. 14, 2005. See, also, <http://www.fireflymobile.com/>. "The Firefly phone is a pioneering voice-only phone designed for the smaller hands of kids aged eight to 12 years old. With just five keys instead of a regular dial pad, parents use a PIN to program up to 22 outgoing numbers into the phone, including speed-dial keys for Mom and Dad. The patented phone lights up like a firefly when in use and intermittently when in standby mode. It is about the size of a small pocket calculator and weighs two ounces." Firefly Mobile, *Firefly Mobile Announces Firefly Phone for Tweens*, News Release, Mar. 9, 2005.

⁶¹ Nextel, SEC Form 10-K (filed Mar. 15, 2005), at 2. Boost Mobile used to be joint venture between Nextel and an Australian-based company. See *Ninth Report*, at 20615.

⁶² Nextel, SEC Form 10-K (filed Mar. 15, 2005), at 1. Boost Mobile accounted for 26 percent of Nextel's new subscribers in 2004. Li Yuan, *Pay First, Call Later*, WALL STREET JOURNAL, Apr. 25, 2005, at R10 ("Pay First").

⁶³ See Section IV.B.1.e, *infra*; Wireless Broadband Access Task Force, Federal Communications Commission, GN Docket No. 04-163, Report (rel. February 2005), at 23 ("*Wireless Broadband Access Task Force Report*"); Clearwire, *Now Serving/Coming Soon* (visited August 2, 2005) <<http://www.clearwire.com>> (indicating that the markets currently served by Clearwire include Daytona Beach, FL; Abilene, TX; Midland/Odessa, TX; Duluth, MN; St. Cloud, MN; Eau Claire, WI; Eugene, OR; Medford, OR; Stockton, CA; Modesto, CA; Merced, CA; and Visalia, CA).

⁶⁴ Clearwire, *Service Plans* (visited June 3, 2005) <<http://www.clearwire.com>>.

⁶⁵ *Id.*; "Delivering the Future of Broadband Wireless Today," Presentation by Guy Kelnhofer, President and CEO, NextNet Wireless, submitted at the Wireless Broadband Forum, May 19, 2004, Federal Communications Commission, Washington, DC.

⁶⁶ See Section IV.B.1.e, *infra*, for a more detailed discussion of OFDM technology.

announced in October 2004 that it plans to deploy equipment based on the 802.16e WiMax standard once the standard has been finalized.⁶⁷

32. In addition to Clearwire, several small wireless broadband providers operating in the BRS/EBS band have begun to roll out mobile or portable wireless broadband services using non-line-of-sight OFDM equipment, some of which is manufactured by NextNet Wireless, to their customers. These providers include, for example, Plateau Telecommunications in New Mexico and Texas; Info-Link.net in west central Minnesota; Evertex in Iowa; SpeedNet in Michigan; Gryphon Wireless in Kearney, NE; W.A.T.C.H. TV in Lima, OH; BeamSpeed in Yuma, AZ; and Rioplex Wireless in Port Isabel, TX.

33. Paging/messaging carriers provide narrowband data-only services using paging and narrowband PCS networks and spectrum, and paging/messaging devices or units. In November 2004, Metrocall completed its acquisition of WebLink Wireless and formed a new company called USA Mobility. USA Mobility is the largest U.S. paging company and offers both traditional paging services and two-way messaging services. Other major paging carriers include SkyTel Communications, Inc., SBC Paging, and Verizon Wireless' paging business.⁶⁸

34. In addition to the paging/messaging carriers, there are a few carriers that sell other narrowband mobile data services exclusively, rather than both mobile voice and data services, including Motient Corp. ("Motient") and Space Data Corp. ("Space Data"). Motient has specialized in selling and integrating wireless data solutions to enterprises, including wireless e-mail and other wireless Internet applications.⁶⁹ Space Data is currently providing commercial telemetry services across the south-central United States to energy and other industrial companies.⁷⁰

4. Satellite Providers

35. As of year-end 2004, a number of carriers were providing mobile satellite services ("MSS") in the United States.⁷¹ Both Globalstar Telecommunications LTD. ("Globalstar") and Iridium Satellite LLC. ("Iridium Satellite") are using Big LEO MSS licenses to offer mobile voice and data services to a variety of mobile terminals, including hand-held terminals, and to fixed terminals. Inmarsat Ltd. ("Inmarsat") and MSV, the successor to Motient Services Inc., which had previously entered into a joint venture with Mobile Satellite Ventures (Canada) Inc. and the Canadian licensee of MSS satellite MSAT-1 (TMI Corporation), were also providing voice and data communications via satellite in the L-band at year-end 2004. The companies offer voice and data services in fixed and mobile environments.

⁶⁷ See Section IV.B.1.e, *infra*.

⁶⁸ SkyTel Communications, Inc. is a wholly owned subsidiary of MCI (formerly WorldCom) that was acquired on October 1, 1999. See *Fifth Report*, at 17720-17721. Mike Dano, *Nationwide paging down to one carrier*, RCR WIRELESS NEWS, Apr. 5, 2004, at 3+.

⁶⁹ See Brad Smith, *Early Data Models Drain Finances*, WIRELESS WEEK, Apr. 15, 2004 ("Early Data Models Drain Finances").

⁷⁰ *Space Data's SkySite® Network Takes Off Over South-Central U.S.*, Press Release, Space Data Corporation, Oct. 19, 2004. See Section IV.B.1.e, *infra*.

⁷¹ In order to place a satellite telephone call, an "outbound" communication from an MSS mobile phone is transmitted up to the satellite, using "service link" frequencies. The satellite then retransmits the signal back down to the earth, using "feeder link" frequencies, to a gateway ground station, where the call is interconnected with terrestrial networks, such as the PSTN. The return or "inbound" communication works the exact opposite way. The communication from the terrestrial network is transmitted from the gateway earth station up to the satellite, and then retransmitted by the satellite back down to the MSS mobile telephone. In systems with inter-satellite links, the inbound and outbound communications may be transmitted through multiple satellites in order to complete the connection between the originating mobile telephone and the receiving gateway ground station.

The mobile environment consists of a laptop-sized or larger terminal that can be transported from one location to another. Another company, ICO Global Communications (Holdings) Ltd., has not yet begun commercial service.

C. Horizontal Concentration

36. The level of market concentration generally depends on both the number of competing carriers per market and the distribution of their respective market shares. Thus, market concentration can result from both a relatively small number of carriers competing in the relevant market and a relatively high degree of inequality in the distribution of market shares among incumbent carriers. In conjunction with entry conditions and the way carriers and consumers behave and interact, market concentration affects the likelihood that a single carrier unilaterally, or a small group of carriers through coordinated action, could successfully exercise market power.

37. The basic economic principle for defining the scope of the relevant geographic market is to include customers facing the choice of similar competitive alternatives in the same geographic market. Because U.S. mobile telephone carriers have different-sized geographic footprints, any individual mobile carrier does not compete with all other mobile carriers in each and every part of the country. This suggests that the relevant geographic market for mobile telephone services is narrower than the entire nation. An attempt to measure concentration in mobile telephone services at the national level would understate the actual level of market concentration because the underlying geographic market definition would be too broad. At the same time, defining the appropriate regional or local geographic market for mobile telephone services is a highly complex exercise due to various factors, including the relatively large number of licensed carriers, the variety of geographic schemes used to license different spectrum bands, the wide variation in carriers' geographic footprints, and the difficulty of collecting accurate information on the geographic coverage each mobile carrier provides in its license areas. To simplify the measurement task, we base our analysis of market concentration on uniform geographic areas that may be broader or narrower than the relevant geographic market. In particular, we estimate the number of competitors per market on a county-by-county basis, and we provide concentration measures at the level of EAs.

1. Number of Mobile Telephone Competitors

38. To track the level of competition in the mobile telephone sector, the Commission compiles a list of counties with some level of coverage by mobile telephone providers. This data is based on publicly-available sources of information released by the operators such as news releases, filings with the SEC, coverage maps available on operators' Internet sites, and information filed publicly⁷² with the Commission in proceedings or with applications.⁷³

⁷² This data is not based on information that is subject to a protective order.

⁷³ The Commission has buildout rules for geographic area licenses, although they do not require operators to deploy networks such that the entire geographic area of a specific license receives coverage. For example, the construction requirements for the 30 megahertz broadband PCS licenses state that an operator's network must serve an area containing at least one-third of the license area's population within five years of the license being granted and two-thirds of the population within 10 years. Licensees may, in the alternative, provide substantial service to their licensed area within the appropriate five- and ten-year benchmarks. *See* 47 C.F.R. § 24.203(a). Similarly, the construction requirements for the 10 and 15 megahertz broadband PCS licenses state that an operator must cover one-quarter of a license area's population, or provide "substantial service," within five years of being licensed. *See* 47 C.F.R. § 24.203(b). The details concerning exactly which geographic areas or portions of the population should be covered to meet these requirements are left to the operators. In addition, decisions about whether to increase coverage above these requirements are left to the operators. For information on the buildout requirements for cellular licenses, *see* 47 C.F.R. §§ 22.946, 22.947, 22.949, 22.951. For information on the buildout requirements for non-site based SMR licenses, *see* 47 C.F.R. §§ 90.665 and 90.685.

39. As previously discussed, there are several important caveats to note when considering these data. First, to be considered as “covering” a county, an operator need only be offering any service in a portion of that county. Second, multiple operators shown as covering the same county are not necessarily providing service to the same portion of that county. Consequently, some of the counties included in this analysis may have only a small amount of coverage from a particular provider. Third, the figures for POPs and land area in this analysis include all of the POPs and every square mile in a county considered to have coverage.⁷⁴ Therefore, this analysis overstates the total coverage in terms of both geographic areas and populations covered.

40. On the other hand, this county-by-county analysis reflects a significant improvement in accuracy. In past *Reports*, the Commission provided summaries of estimated coverage by BTAs. Starting with the *Fifth Report*, the Commission decided to re-estimate and enhance these coverage maps using county boundaries in an attempt to provide a more precise picture of network deployment. Moreover, while the newer broadband PCS and digital SMR entrants have less complete networks, the original cellular licensees have extensive networks that provide almost complete coverage of the entire land mass of the continental United States.⁷⁵ Cellular licensees were originally awarded a geographical area (CMA) as a license area, but they only retained that portion of the CMA where they had built out and expanded their wireless networks.⁷⁶

41. To date, 277 million people, or 97 percent of the total U.S. population, have three or more different operators (cellular, PCS, and/or digital SMR) offering mobile telephone service in the counties in which they live.⁷⁷ However, these counties make up only 63 percent of the total land area of the United States, reflecting the nation’s uneven population distribution.⁷⁸ Roughly 250 million people, or 87 percent of the U.S. population, live in counties with five or more mobile telephone operators competing to offer service, while 117 million people, or 41 percent of the population, live in counties with six or more mobile telephone operators competing to offer service. While the percentage of the U.S. population living in counties with three or more, four or more, or five or more mobile telephone carriers is unchanged since the *Ninth Report*, there has been a sharp drop in the percentage of the population living in counties with more than six providers⁷⁹ due to the merger of Cingular Wireless and AT&T Wireless.⁸⁰

⁷⁴ All population figures are based on the Bureau of the Census’s 2000 county population.

⁷⁵ See Appendix B, Maps 2-3, *infra*. By overlapping cellular Service Area Boundaries (SABs) over census block groups, we found that less than one-tenth of one percent of the US population lacked cellular coverage. FCC internal analysis. Wireless coverage is so pervasive, in fact, that the Wall Street Journal ran an article rating hotels on their *lack* of wireless service for those who desire to get away from it all. Nancy Keates and Shawn Young, *Destination: Unreachable*, WALL STREET JOURNAL, Apr. 23, 2004, at W1.

⁷⁶ Cellular licensees were originally awarded a geographical area (CMA) as a license area, but they only retained that portion of the CMA where they had built out and expanded their wireless networks. See Amendment of Part 22 of the Commission’s Rules to Provide for the Filing and Processing of Applications for Unserved Areas in the Cellular Service and to Modify other Cellular Rules, *First Report and Order and Memorandum Opinion and Order on Reconsideration*, 6 FCC Rcd 6185, 6196-6200 (1991). Initial cellular system operators were given a five-year period during which to expand their systems within the CMAs in which they were licensees. *Id.*

⁷⁷ See Appendix A, Table 5, *infra*.

⁷⁸ *Id.* We note that the land area of these counties, 2.2 million square miles, is almost 50 percent larger than the combined land area of the 25 member countries of the recently expanded European Union (1.5 million square miles).

⁷⁹ See Appendix A, Table 9, *infra*.

⁸⁰ See Section III.D, Consolidation and Exit, *infra*. In the coming year, we will track the effects of more recent mergers on market structure, carrier conduct, consumer behavior, and market performance.

2. Concentration Measures for Mobile Telephone Services

42. This section reports the results of using the Herfindahl-Hirschman Index (“HHI”) to measure market concentration with respect to the provision of mobile telephone services in EAs.⁸¹ The value of the HHI reflects both the number of market competitors and the distribution of their market shares. In general, the value of the HHI declines as the number of firms increases and it increases with rising inequality among any given number of firms.⁸²

43. In principle, the market shares used to calculate HHIs can be based on various output measures, such as revenues or the number of subscribers. For reasons of data availability we have elected to calculate each mobile carrier’s market share based on the number of subscribers served by each carrier. The number of subscribers served by each carrier is determined based on the Commission’s NRUF data, which track phone number usage information for the United States.⁸³

44. Finally, we use EAs as the geographic unit for measuring concentration in mobile telephone markets because we believe that an EA captures the area in which the average person shops for and purchases a mobile phone, most of the time.⁸⁴ We emphasize that, in using the EA to calculate market shares for the purposes of this report, we are not concluding that the EA is the relevant geographic market for other purposes.⁸⁵

45. Based on NRUF data as of December 2004, the average value of the HHIs weighted by EA population is 2450, and the median value is about 2583.⁸⁶ The values of HHIs for individual EAs range from a low of 1554 in EA 107 (covering parts of Wisconsin, Iowa and Minnesota, including the Twin Cities) to a high of 7064 in EA 142 (covering parts of Nebraska and Wyoming). Thus, the values of the weighted average HHI and also the HHIs in nearly half of all EAs are lower than 2500, which would be the value of HHI for a hypothetical market in which there are four carriers with equal market shares.

⁸¹ The HHI is calculated by summing the squares of the individual market shares of all firms competing in the relevant market. When a single firm is the sole supplier in the relevant market (a pure monopoly), the HHI attains its maximum value of 10,000 (100×100). As the structure of a market becomes progressively more atomistic, the value of HHI approaches 0.

⁸² For example, if four carriers are identified as participants in the relevant product and geographic market and each carrier accounts for 25 percent of total sales, the value of HHI would be 2500 [$(25)^2 \times 4$]. If the number of carriers increases to five, each with a 20 percent market share, the value of HHI would decline to 2000 [$(20)^2 \times 5$]. On the other hand, if there are still only four carriers but the top carrier has a 40 percent market share while each of the remaining three carriers has 20 percent, the value of HHI would increase from 2500 to 2800 [$(40)^2 + (20)^2 \times 3$].

⁸³ The methodology used to compile NRUF data is described in Section VI.B.4, Sub-National Penetration Rates.

⁸⁴ See Section VI.B.4, Sub-National Penetration Rates, *infra*. The use of EAs also minimizes the distortions from the use of NRUF data. In addition to the limitations of the NRUF data, the methodology used to calculate the HHIs for EAs has its own limitations. The methodology gives equal weight to a mobile carrier that reports assigned numbers in one county as it does to a carrier that reports assigned numbers in all counties, or at least more than one county, within the EA. In effect, the methodology is based on the implicit assumption that the EA is the relevant geographic market, so that each carrier with assigned numbers in the EA is competing head to head with all other carriers operating in the EA. However, to the extent that carriers have different coverage areas that do not overlap, not all carriers with assigned numbers in an EA are in fact direct competitors. The implication is that the HHIs for EAs will tend to understate systematically the actual level of market concentration because the underlying geographic market definition is overly broad. On the other hand, there may be factors that would cause the relevant geographic market to be broader.

⁸⁵ In other contexts, such as the Commission’s review of license transfers and assignments, the relevant geographic market for calculating HHIs may be greater or less than an EA.

⁸⁶ See Appendix A, Table 3, *infra*. The simple mean (not weighted by population) is 2901.

46. As a benchmark for examining the EAs with relatively high HHIs, we note that the value of HHI in a market that is equally divided among three competitors is approximately 3333. However, there are five or more competitors in all but two of the EAs with HHIs in excess of 3300. This suggests that the high HHI values in most of these EAs are generally due not to the number of competitors, but rather to the limited effect of competitive entry to date in eroding the market shares of one or both carriers holding the two original cellular licenses.

47. In interpreting these HHIs, it is worth noting that the specific technological and economic characteristics of an industry are important determinants of the level of market concentration. Of particular importance is the relationship between economies of scale and the potential size of the market. In industries where the scale of output at which a firm can fully exploit scale economies (the minimum efficient scale) is large relative to potential demand, there will be room in the market for only a small number of firms operating at the lowest possible cost. In theory, therefore, market concentration in such industries will tend to be high relative to industries characterized by greater potential demand or smaller minimum efficient scale.

48. In light of the impact of technological and economic factors in determining the level of market concentration, it is noteworthy that the estimated values of HHIs for EAs tend to increase as the EA population declines. In other words, consistent with the theoretical considerations noted above, market concentration tends to be higher in EAs with a smaller potential subscriber base. For example, the EA with the highest HHI has the third smallest population, and the EA with the second highest HHI (EA 121, covering parts of Nebraska and Colorado) has the smallest population.

49. However, some EAs are clear exceptions to this pattern. In particular, there are a number of EAs with mid-sized or relatively large populations that also have relatively high HHIs. Such apparent discrepancies may arise partly because the EAs also vary with regard to other important determinants of market demand and cost besides total population, including factors such as the age distribution of the population, per capita income, population density, urbanization, and the size and composition of the business sector.⁸⁷ Absent a more systematic analysis of the possible relationship between these explanatory factors and market concentration, we cannot make a determination of the extent to which market concentration in any given EA is explained by potential market demand and cost considerations.

3. International Comparison of Mobile Market Concentration

50. Concentration in mobile markets abroad provides another benchmark against which to evaluate U.S. mobile market concentration. This section compares the structure of mobile telephone markets in the United States and selected countries with regard to the number of market competitors and concentration measures calculated using HHIs. We note that international differences in mobile market concentration may reflect a variety of factors, including differences in the regulatory environment.

51. Despite the reduction in the number of national mobile operators from six to five as a result of the merger of Cingular and AT&T Wireless, as of the end of 2004 the United States still had one or two more national operators than most other industrialized countries of comparable income levels.⁸⁸ Several Western European countries, including the United Kingdom, the Netherlands, and Austria, also

⁸⁷ The average cost of serving a given market tends to decline with higher population density and urbanization because high concentrations of subscribers make it easier for operators to provide adequate coverage with less infrastructure deployment. See Eugence C. Signorini, *Wireless Coverage in the United States: Leaving a Lot to Be Desired*, THE YANKEE GROUP REPORT, Vol. 1, No. 11, Aug. 2000, at 8.

⁸⁸ Glen Campbell *et al.*, *Global Wireless Matrix 4Q04*, Merrill Lynch, Global Securities Research & Economics Group, Apr. 13, 2005, at 3 (“*Global Wireless Matrix 4Q04*”).

have five national mobile operators.⁸⁹ In the remaining Western European countries, there are generally three or four national mobile operators. Some comparable Asian-Pacific countries, such as Japan and Australia, also have three or four national mobile operators as of the end of 2004.⁹⁰ The principal exception is Hong Kong, which has six mobile operators.⁹¹

52. While there are a number of large regional and local mobile operators in addition to the nationwide mobile operators in the United States, competition in Western European mobile markets is generally limited to the nationwide mobile operators. As detailed above, the number of mobile competitors per market in the United States varies by region, ranging from as many as seven or more in some areas to fewer than four competitors in some other areas. Nevertheless, as previously mentioned 97 percent of the total U.S. population live in counties with a minimum of three different mobile operators, the same as the maximum number of national mobile carriers in most of the smaller Western European markets.

53. Since European regulators awarded nationwide licenses for second-generation GSM and third-generation services, national boundaries are the relevant geographic market for measuring concentration in European mobile markets. For purposes of comparison, we computed HHIs based on subscriber shares as of the fourth quarter of 2004 for the following seven countries: Finland, France, Germany, Italy, the Netherlands, Spain and the United Kingdom.⁹² The lowest HHI values are found in the United Kingdom (2308) and the Netherlands (2487). Mobile subscribers in the United Kingdom are relatively evenly divided among the four GSM operators, and a fifth operator, a 3G start-up, launched service in 2003. The Netherlands, with five GSM operators, is the only European country to have awarded more than four GSM licenses. The values of HHI in the remaining countries range from a low of 3196 in Germany to a high of 4362 in Finland. The relatively high values of HHI in this group of countries reflect two factors. One is the small number of competitors per market, with four carriers in Germany and Italy and only three carriers in the remaining countries. Second, each market tends to be dominated by the top two competitors, which have a combined market share ranging from 76 percent in

⁸⁹ At this writing, however, leading Dutch mobile operator KPN has agreed to acquire smaller mobile operator Telfort, while Deutsche Telekom has agreed to acquire Austrian mobile provider Tele.ring and plans to fold the company into its T-Mobile Austria unit. See Stefan Simons, *KPN Agrees to Acquire Telfort for \$1.19 Billion*, WALL STREET JOURNAL, June 29, 2005; *Deutsche Telekom to Acquire Teler.ring for \$1.61 Billion*, WALL STREET JOURNAL, Aug. 10, 2005. If approved, these transactions would reduce the number of national mobile operators in the Netherlands and Austria from five to four.

⁹⁰ Merrill Lynch indicates that there are seven players in the Japanese mobile market. See *Global Wireless Matrix 4Q04*, at 3. However, there are only three main operators providing nationwide cellular mobile phone services. See Lara Srivastava, *Shaping the Future Mobile Information Society: The Case of Japan*, Document SMIS/06, International Telecommunications Union, Feb. 26, 2004, at 15. Apart from the three main providers of cellular mobile services, there are three operators providing an alternative mobile service based on a mobile phone system called personal handyphone system ("PHS"). Relative to cellular service, however, PHS has limited coverage and is primarily a cordless phone. Launched in 1995, PHS initially had a rapid uptake, but the number of subscribers later declined, and it now accounts for a small fraction of the total mobile service market in Japan. *Id.* In addition, of the three PHS operators, until recently two were affiliated with nationwide providers of cellular mobile phone services. *Id.*, at 11.

⁹¹ There are also some exceptions among emerging markets, including Taiwan (six mobile operators) and Indonesia (seven). *Global Wireless Matrix 4Q04*, at 3.

⁹² The subscriber shares used to calculate HHIs for European mobile markets were taken from *Global Wireless Matrix 4Q04*, at 74, 76, 78, 94, 104, 126, and 138.

Germany and Spain to 86 percent in Finland.⁹³

54. Recalling that for EAs in the United States the average value of the HHIs weighted by EA population is 2450 and that the median value is about 2583, it is evident that concentration is somewhat higher in the U.S. mobile market on average than in the least concentrated European mobile market (the United Kingdom, at 2308), and roughly the same as in the second least concentrated European mobile market (the Netherlands, at 2487). If we take the top third of EAs by HHI values, we find that the European mobile markets with higher concentration levels (in other words, with HHIs ranging from 3196 to 4362) would fall within this top third. At the same time, there are 49 EAs, or about 17 percent of the total, with higher mobile market concentration levels than Finland, the European country with the highest mobile market HHI among the European countries included in this comparison.

D. Consolidation and Exit

55. Consolidation and exit of service providers, whether through secondary market transactions or bankruptcy, may affect the structure of the mobile telecommunications market. A reduction in the number of competing service providers due to consolidation or exit may increase the market power of any given service provider, which in turn could lead to higher prices, fewer services, and/or less innovation. However, consolidation does not always result in a negative impact on consumers. Consolidation in the mobile telecommunications market may enable carriers to achieve certain economies of scale and increased efficiencies compared to smaller operators.⁹⁴ If the cost savings generated by consolidation give the newly enlarged carrier the ability and the incentive to compete more aggressively, consolidation could result in lower prices and new and innovative services for consumers.⁹⁵ Moreover, it is unlikely that competitive harm will result from consolidation among service providers licensed to operate in separate geographic markets.

56. Among the policies potentially affecting consolidation in this market, the Commission eliminated a rule limiting the amount of spectrum a CMRS licensee could own or control in a given licensed area, effective January 2003.⁹⁶ On July 8, 2004, the Commission also eliminated the cellular cross-interest rule then applicable only in Rural Service Areas (“RSAs”) and transitioned to case-by-case competitive review for all applications related to transactions involving cellular licenses.⁹⁷

⁹³ *Global Wireless Matrix 4Q04*, at 3. In some West European and Asian countries, including Norway, Iceland, Switzerland, and Japan, the dominant mobile operator accounts for more than half of the mobile subscribers in the market. Additionally, in some of these countries the incumbent wireline operator is also the dominant mobile operator. See *Communications Outlook 2005*, Organization for Economic Cooperation and Development, 2005, at 46 (“*OECD Communications Outlook 2005*”).

⁹⁴ See Section III.C.2, *supra*, and Section III.E.2, *infra*, for a fuller discussion of how economies of scale may affect market structure.

⁹⁵ See Jonathan B. Baker, *Developments in Antitrust Economics*, JOURNAL OF ECONOMIC PERSPECTIVES, Vol. 13, No. 1, Winter 1999, at 182.

⁹⁶ 2000 Biennial Regulatory Review, Spectrum Aggregation Limits for Commercial Mobile Radio Services, *Report and Order*, 16 FCC Rcd 22668, at 22693 (2001) (“*Spectrum Cap Order*”).

⁹⁷ FCC Adopts Measures to Increase Rural Investment and Facilitate Deployment of Spectrum-Based Services in Rural Areas, *News Release*, Federal Communications Commission, Jul. 8, 2004 (“*Rural Order PN*”). Until then, the Commission had retained the cellular cross-interest rule in RSAs, while at the same time creating a waiver process in recognition that there may be RSAs in which such cross interests would not create a significant likelihood of substantial competitive harm.

57. Since the end of 1999, carriers have been building nationwide footprints⁹⁸ through various forms of transactions.⁹⁹ One of the driving forces behind many of these transactions has been the desire of large regional carriers to enhance their ability to compete with existing nationwide operators that offer attractive nationwide pricing plans.¹⁰⁰ Also, as the Commission has previously concluded, operators with larger footprints can achieve certain economies of scale and increased efficiencies compared to operators with smaller footprints.¹⁰¹ More recently, national operators have sought to fill in gaps in their coverage areas,¹⁰² as well as to increase the capacity of their existing networks. Since the writing of the *Ninth Report*, a number of transactions between market participants have been announced. We discuss the transactions involving the largest impact, either through the exchange of subscribers or spectrum licenses, on the structure of the market below.

1. Sales and Swaps

58. *Cingular / AT&T Wireless* – On October 26, 2004, Cingular Wireless announced that it had completed its acquisition of AT&T Wireless, creating a company with more than 46 million subscribers.¹⁰³ In addition to a series of spectrum and business divestitures required by the Commission and the Department of Justice for approval,¹⁰⁴ the merger precipitated a number of changes in the relationships between Cingular and its business partners, including the unwinding of the Cingular- T-Mobile infrastructure sharing agreement,¹⁰⁵ the right of Cincinnati Bell Wireless to buy Cingular's 19.9 percent interest in the company for \$83 million,¹⁰⁶ and the surrender of Cingular's interest in Suncom Wireless, Inc. ("Suncom") (formerly Triton PCS)¹⁰⁷ as part of a larger deal to swap spectrum and networks in Virginia, North Carolina, and Puerto Rico.¹⁰⁸

⁹⁸ Generally, "footprint" is an industry term of art referring to the total geographic area in which a wireless provider offers service or is licensed to offer service.

⁹⁹ The Commission must consent to the transfer of control or assignment of all spectrum licenses used to provide wireless telecommunications services. 47 C.F.R. § 1.948.

¹⁰⁰ See *Fifth Report*, at 17699 (For a complete discussion of the motivations for this phenomenon, see *Fourth Report*, at 10159-10160).

¹⁰¹ See *Seventh Report*, at 12997. One study found bigger companies get better equipment prices because of their size. Shawn Young, *As Wireless Firms Grow, So Can Costs*, WALL STREET JOURNAL, Apr. 29, 2004, at B4. However, the study also found that the cost of signing up new customers increases as wireless companies get bigger.

¹⁰² For a more complete discussion of the motivations for this phenomenon, see *Fourth Report*, at 10159-10160.

¹⁰³ *Cingular Completes Merger With AT&T Wireless*, News Release, Cingular Wireless, Oct. 26, 2004. See, also, *Ninth Report*, at 20623.

¹⁰⁴ Applications of AT&T Wireless Services, Inc., Transferor, and Cingular Wireless, Corp., Transferee, *Memorandum Opinion and Order*, 19 FCC Rcd 21522, 21543 (2004) (DOJ conditions); 21619-21622 (FCC conditions) ("*Cingular-AT&T Wireless Order*").

¹⁰⁵ See *Ninth Report*, at 20625.

¹⁰⁶ In addition, the agreement waived the non-compete clause with Cingular, and the company received reduced roaming rates on Cingular's networks. *Cincinnati Bell Inc. Reaches Agreement with Cingular and AT&T Wireless on Wireless Services in Cincinnati and Dayton*, News Release, Cincinnati Bell, Aug. 5, 2004.

¹⁰⁷ In 2005, Triton PCS, Inc. changed its name to SunCom Wireless, Inc. Suncom Wireless, SEC Form 10-K, Mar 31, 2005, at F-7.

¹⁰⁸ *Cingular, AT&T Wireless And Triton PCS Sign Letter Of Intent To Exchange Operations In N. Carolina, Puerto Rico and Virginia*, News Release, Triton PCS and Cingular Wireless, July 8, 2004. Under the terms of the agreement, Cingular would receive Suncom's network assets and customers in Virginia, while Suncom would (continued....)

59. *ALLTEL / Western Wireless* – On January 10, 2005, ALLTEL announced that it had reached an agreement to purchase Western Wireless Corporation (“Western Wireless”) in a stock-and-cash transaction valued at approximately \$6 billion.¹⁰⁹ ALLTEL would gain about 1.4 million domestic wireless customers in 19 western and midwestern states that are contiguous to existing properties, giving ALLTEL 10 million domestic wireless customers in 33 states.¹¹⁰ With this acquisition, ALLTEL would add wireless operations in 9 new states - California, Idaho, Minnesota, Montana, Nevada, North Dakota, South Dakota, Utah and Wyoming. – and significantly expand its wireless operations in Arizona, Colorado, New Mexico and Texas.¹¹¹ On July 11, 2005, the Commission approved the company's merger with Western Wireless,¹¹² which included divesting markets in Arkansas, Kansas and Nebraska.¹¹³ The companies completed the merger on August 1, 2005.¹¹⁴

60. *Sprint / Nextel* – On Dec. 15, 2004, Sprint and Nextel announced that they had agreed to “a merger of equals.”¹¹⁵ Sprint and Nextel are being valued equally in the merger and their shareholders will each own approximately 50 percent of the new company after the merger.¹¹⁶ According to the companies, Sprint and Nextel, including their affiliates and partners, serve more than 40 million wireless subscribers and operate networks that directly cover nearly 262 million people.¹¹⁷ On August 12, 2005, the companies completed the merger, after having received regulatory approval from the Commission and the DOJ.¹¹⁸ The combined entity has begun the process of spinning off Sprint’s local telecommunications business, which has 7.7 million local access lines in 18 states.¹¹⁹ The merger may also precipitate the purchase of Nextel Partners by the combined company.¹²⁰

(Continued from previous page) _____

receive certain (formerly) AT&T Wireless network assets and customers in North Carolina and Puerto Rico, plus \$175 million in cash from Cingular. Additionally, the companies terminated their exclusivity arrangement.

¹⁰⁹ *ALLTEL to Purchase Western Wireless in \$6 Billion Transaction*, News Release, ALLTEL, Jan. 10, 2005.

¹¹⁰ *Id.*

¹¹¹ *Id.*

¹¹² FCC Consents With Conditions To ALLTEL Corporation Acquisition of Western Wireless Corporation Licenses and Authorizations, *News Release*, FCC, July 11, 2005.

¹¹³ *Id.*; *FCC Approves ALLTEL Merger with Western Wireless*, News Release, ALLTEL, July 11, 2005. The DOJ approved the merger contingent upon divesting 16 markets in Arkansas, Kansas and Nebraska now owned and operated by Western Wireless. The divestiture includes all the assets – licenses, retail stores, employees and cell sites – used to operate Western Wireless’s CDMA wireless business in those markets. The company also will divest the Cellular One brand that is owned by Western Wireless. *FCC Approves ALLTEL Merger with Western Wireless*, News Release, ALLTEL, July 11, 2005.

¹¹⁴ *ALLTEL completes merger with Western Wireless*, News Release, ALLTEL, Aug. 1, 2005.

¹¹⁵ *Sprint and Nextel To Combine in Merger of Equals*, News Release, Sprint and Nextel, Dec. 15, 2004.

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Sprint Nextel Completes Merger*, News Release, Sprint Nextel, Aug. 12, 2005; *Sprint Nextel Says It Intends to Pursue Appraisal Process with Nextel Partners*, News Release, Sprint Nextel, Aug. 17, 2005; FCC Consents to Sprint Corporation Acquisition of Nextel Communications Licenses and Authorizations, *News Release*, Federal Communications Commission, Aug. 3, 2005.

¹¹⁹ *Sprint Nextel Completes Merger*, News Release, Sprint Nextel, Aug. 12, 2005; *Sprint and Nextel To Combine in Merger of Equals*, News Release, Sprint and Nextel, Dec. 15, 2004.

¹²⁰ See Section III.D.2, Affiliations, *infra*.

61. *Sprint PCS / US Unwired* – Sprint also recently announced an agreement to purchase its affiliate US Unwired Inc. (“US Unwired”) for approximately \$1.3 billion.¹²¹ US Unwired provides service under the Sprint PCS brand in nine states - Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Oklahoma, Tennessee and Texas - and serves more than 500,000 subscribers.¹²² As part of the agreement, Sprint and US Unwired will seek an immediate stay of pending litigation between the two companies, including US Unwired's request for an injunction to block the merger of Sprint and Nextel, with a final resolution to become effective upon the closing of the acquisition.¹²³

62. *Verizon Wireless / Nextwave Spectrum* – On April 13, 2005, Verizon Wireless completed the purchase of NextWave Telecom's remaining spectrum licenses for \$3.0 billion.¹²⁴ The transaction, originally announced in November 2004, involved 10 and 20 MHz licenses covering 23 markets around the country, including New York, Boston, Washington, D.C., and Los Angeles. Verizon Wireless states that this additional spectrum will help the company meet its customers' “growing demand for wireless voice and data services.”¹²⁵

2. Affiliations

63. Three of the nationwide operators also have extended their coverage through contractual affiliations with smaller carriers. These affiliations create a “family” of operating companies with much closer relationships than those formed by traditional roaming agreements.¹²⁶ All of these affiliations were established to accelerate the build-out of the larger companies' networks by granting smaller affiliates the exclusive right to offer mobile services for those companies, in some cases under the larger companies' brand names, in selected mid-sized and smaller markets.¹²⁷

64. *Cingular (formerly AT&T Wireless)* – With Cingular Wireless's acquisition of AT&T Wireless, the combined company ended its special relationship with Suncom, as discussed above, although it did retain AT&T Wireless's equity interest in Edge Wireless, LLC (“Edge”).¹²⁸ Edge markets its service under its own name, but describes itself in news releases as “affiliated with Cingular Wireless.”¹²⁹

65. *Nextel* – The Nextel family consists of Nextel and Nextel Partners, Inc. (“Nextel

¹²¹ *Sprint to Acquire Wireless Affiliate US Unwired for \$1.3B*, News Release, Sprint PCS, July 11, 2005.

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Verizon Wireless Completes Purchase Of NextWave Spectrum Licenses In 23 Markets*, News Release, Verizon Wireless, Apr. 13, 2005.

¹²⁵ *Id.*

¹²⁶ See Section IV.B.3, Roaming, *infra*.

¹²⁷ See, e.g., Nextel, Automatic and Manual Roaming Obligations Pertaining to Commercial Mobile Radio Services, WT Docket No. 00-193, *Comments*, at note 20 (filed Jan. 5, 2001) (“To facilitate rapid deployment of its network throughout suburban, tertiary and rural areas of the country and move towards more ubiquitous nationwide service, Nextel entered into an agreement with Nextel Partners . . . to construct iDEN coverage using Commission licensed frequencies disaggregated by Nextel to [Nextel Partners], and offering its services to the public under the Nextel brand according to strict service quality standards.”). See, also, Nextel, SEC Form 10-K, filed Mar. 15, 2005, at 15 (We [Nextel] entered into the relationships with Nextel Partners principally to accelerate the build-out of our network outside the largest metropolitan markets areas that initially were the main focus of our network coverage”).

¹²⁸ Cingular Wireless currently owns 35.7 percent of Edge. Cingular Wireless, FCC Form 602 (filed May 16, 2005).

¹²⁹ See, e.g., *Edge Wireless Expands to Taylor Crossing*, News Release, Edge Wireless, July 7, 2005.

Partners”). In 1999, Nextel sold some of its SMR licenses to Nextel Partners in exchange for a minority ownership interest in the company.¹³⁰ Nextel Partners’s iDEN network is compatible with Nextel’s, and Nextel assists Nextel Partners in obtaining terms similar to those Nextel receives from vendors for equipment and services.¹³¹ Both Nextel and Nextel Partners market their services under the Nextel brand name. However, the Sprint-Nextel merger might trigger certain share purchase rights in Nextel’s agreement with Nextel Partners,¹³² requiring the combined company to buy Nextel Partners.¹³³

66. *Sprint PCS* – The Sprint PCS family consists of Sprint PCS and 10 affiliates.¹³⁴ Each of the affiliates has an agreement with Sprint PCS to use the latter’s PCS licenses to deploy CDMA technology and Sprint PCS-branded service in specific areas of the country.¹³⁵ In return, Sprint PCS receives a percentage of the affiliates’ local service revenue.¹³⁶ In addition, Sprint PCS performs back-office tasks for its affiliates, giving them the benefits of economies of scale for billing and customer service.¹³⁷ It is not clear how the merger would affect Sprint’s relationships with its affiliates. According to one affiliate, Sprint’s integration with Nextel following the merger would conflict with Sprint’s obligations to its affiliates, and that affiliate claimed that Sprint would attempt to resolve those issues through negotiations.¹³⁸ Sprint PCS affiliates provided service to more than 3.2 million subscribers by the end of 2004.¹³⁹

E. Entry Conditions and Potential Barriers to Entry

67. Market concentration is necessary but not sufficient for unilateral or coordinated anti-competitive behavior to occur. If entry into a market is easy, then entry or the threat of entry may prevent

¹³⁰ Nextel Partners, Inc., SEC Form 10-K, Mar. 22, 2002, at 4. Nextel owns about 32 percent of Nextel Partners. *Sprint and Nextel To Combine in Merger of Equals*, News Release, Sprint and Nextel, Dec. 15, 2005.

¹³¹ Nextel Partners, Inc., SEC Form 10-K, Mar. 16, 2005, at 4.

¹³² *Sprint and Nextel To Combine in Merger of Equals*, News Release, Sprint and Nextel, Dec. 15, 2005.

¹³³ Nextel Partners has the right to put itself to the parent - that is, force the parent to buy Nextel Partners - after a change in control of Nextel. 50.1 percent of non-Nextel held shares must vote in favor to authorize the put. On June 23, Nextel Partners filed a preliminary proxy for shareholders to put the company to Nextel, with a recommendation that shareholders vote in favor of the exercise of put right. Phil Cusick and Richard Choe, *Nextel Partners:NXTL Files Prox; Recommends Put to Shareholders*, Bear Stearns, Equity Research, June 23, 2005, at 1.

¹³⁴ This counts US Unwired as a separate company. *See, however*, Section III.D.1, Sales and Swaps, *supra*. As of November 2004, there were 12 affiliates, including Alamosa Holdings Inc., US Unwired Inc., AirGate PCS Inc., UbiquiTel Inc., Horizon PCS Inc., Shenandoah Telecommunications Co., Enterprise Wireless, Gulf Coast Wireless, iPCS Inc, Independent Wireless One (IWO), Northern PCS, and Swiftel. Phil Cusick and Richard Choe, *Airgate PCS Inc.*, Bear Stearns, Equity Research, Nov. 24, 2004, at 19. Four of these companies have since merged into two. In February 2005, Alamosa completed its acquisition of AirGate, while iPCS completed its acquisition of Horizon PCS in July. *Alamosa Closes Acquisition of AirGate PCS*, News Release, Alamosa, Feb. 15, 2005; *iPCS Announces Closing of Merger with Horizon PCS*, News Release, iPCS, July 1, 2005.

¹³⁵ *See, e.g.*, US Unwired Inc., SEC Form 4249(B)(1), May 17, 2000, at 7.

¹³⁶ *See* Phil Cusick and Richard Choe, *Airgate PCS Inc.*, Bear Stearns, Equity Research, Nov. 24, 2004, at 7.

¹³⁷ *See Eighth Report*, at 14812; Phil Cusick and Richard Choe, *Airgate PCS Inc.*, Bear Stearns, Equity Research, Nov. 24, 2004, at 15.

¹³⁸ Phil Cusick and Richard Choe, *UbiquiTel PCS*, Bear Stearns, Equity Research, July 13, 2005, at 2 (citing a complaint filed by UbiquiTel).

¹³⁹ Sprint, SEC Form 10K/A, filed Apr. 29, 2005, at 34.

incumbent operators from exercising market power, either collectively or unilaterally, even in highly concentrated markets.¹⁴⁰ The ease or difficulty of entry generally depends on the nature and significance of entry barriers. Barriers to entry in the mobile telecommunications market may include first-mover advantages, large sunk costs, and access to spectrum.¹⁴¹

1. Spectrum Allocation and Assignment

68. Government control of spectrum allocation and assignment has the potential to create a significant barrier to entry into markets for mobile communications services by limiting the amount of spectrum allocated to CMRS and by requiring carriers to obtain a government-issued license in order to use such spectrum for the provision of CMRS.¹⁴² However, the Commission has helped to reduce any potential entry-limiting effects of government-controlled spectrum allocation and assignment through various policies. First, as discussed in greater detail below, the amount of spectrum available for the provision of CMRS has been increased. For example, the allocation of 120 MHz of spectrum to broadband PCS ended the cellular duopoly by facilitating the entry of new mobile telephone service providers. Second, the Commission has progressively implemented a more flexible, market-oriented model of spectrum allocation and assignment for spectrum used to provide commercial mobile services. For example, initially spectrum policy restricted the use of cellular spectrum to analog service and limited the number of cellular entrants to two in each local market. In contrast, as detailed below, current policy affords licensees greater flexibility to decide what services to offer and what technologies to deploy on cellular spectrum, as well as other spectrum used for the provision of CMRS, and allows market forces to play a greater role in determining the number of entrants in each local market for mobile telephone service. Finally, subject to the Commission's approval, CMRS licensees are allowed to buy and sell licenses, in whole or in part, on the secondary market. As noted in the *Ninth Report*, beginning in 2003 the Commission also allowed CMRS licensees to lease all or a portion of their spectrum usage rights for any length of time within the license term, and over any geographic area encompassed by the license.¹⁴³ The effect of this flexible, market-oriented spectrum model has been to help reduce any entry barriers that may arise from government regulation of spectrum.

a. Cellular, Broadband PCS, and SMR

69. Currently, mobile telephone operators primarily use three types of spectrum licenses to provide mobile voice and, in most cases, mobile data services: cellular, broadband PCS, and SMR.¹⁴⁴ This information is provided as a basis for understanding the formation of the current industry structure.

70. Cellular – The Commission began licensing commercial cellular providers in 1982 and completed licensing the majority of operators by 1991. The Commission divided the United States and its possessions into 734 cellular market areas (“CMAs”), including 305 Metropolitan Statistical Areas

¹⁴⁰ See DOJ/FTC Guidelines at §3.0; see also Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization* (3rd ed., Addison, Wellsley, Longman, Inc., 1999), at 77.

¹⁴¹ See *Spectrum Cap Order*, 16 FCC Rcd at 22688-91, ¶¶ 39-43.

¹⁴² See, e.g., Thomas W. Hazlett, *The Wireless Craze, The Unlimited Bandwidth Myth, The Spectrum Auction Faux Pas, and the Punchline to Ronald Coase's "Big Joke"*, Working Paper 01-01, AEI-Brookings Joint Center for Regulatory Studies, Jan. 2001; *Spectrum Framework Review: Implementation Plan*, Consultation Document, Office of Communications, Jan. 13, 2005, at 77 and 81-82.

¹⁴³ *Ninth Report*, at 20631.

¹⁴⁴ See Appendix B, Table 1 and Maps 11-14, *infra*, for descriptions and maps of various geographical licensing schemes employed by the Commission.

("MSAs"), 428 Rural Statistical Areas ("RSAs"), and a market for the Gulf of Mexico.¹⁴⁵ Two cellular systems were licensed in each market area. The Commission designated 50 megahertz of spectrum in the 800 MHz frequency band for the two competing cellular systems in each market (25 megahertz for each system). Initially, cellular systems offered service using analog technology, but today most of the service offered using cellular spectrum is digital.¹⁴⁶

71. Broadband PCS – Broadband PCS is similar to cellular service, except that broadband PCS systems operate in different spectrum bands and have been designed from the beginning to use a digital format. Broadband PCS licenses have been assigned through auction, beginning in 1995.¹⁴⁷ The Commission has set aside the spectrum between 1850 MHz and 1990 MHz for broadband PCS. This spectrum includes 120 megahertz used for mobile telephone services, divided originally into three blocks of 30 megahertz each (blocks A, B, and C) and three blocks of 10 megahertz each (blocks D, E, and F).¹⁴⁸ Two of the 30 megahertz blocks (A and B blocks) are assigned on the basis of 51 Major Trading Areas ("MTAs").¹⁴⁹ One of the 30 megahertz blocks (C block) and all three of the 10 megahertz blocks are assigned on the basis of 493 BTAs.¹⁵⁰

¹⁴⁵ Under the original cellular licensing rules, one of the two cellular channel blocks in each market (the B block) was awarded to a local wireline carrier, while the other block (the A block) was awarded competitively to a carrier other than a local wireline incumbent. After awarding the first 30 MSA licenses pursuant to comparative hearing rules, the Commission adopted rules in 1984 and 1986 to award the remaining cellular MSA and RSA licenses through lotteries. By 1991, lotteries had been held for every MSA and RSA, and licenses were awarded to the lottery winners in most instances. In some RSA markets, however, the initial lottery winner was disqualified from receiving the license because of a successful petition to deny or other Commission action. Implementation of Competitive Bidding Rules to License Certain Rural Service Areas, *Report and Order*, 17 FCC Rcd 1600, 1611-1662 (2002). In 1997, the Commission auctioned cellular spectrum in areas unbuilt by the original cellular licensees. See FCC, *Auction 12: Cellular Unserved* (visited Apr. 12, 2002) <<http://wireless.fcc.gov/auctions/12/>>. In 2002, the Commission auctioned three RSA licenses where the initial lottery winner had been disqualified. See FCC, *Auction 45: Cellular RSA* (visited Jun. 7, 2002) <<http://wireless.fcc.gov/auctions/45/>>.

¹⁴⁶ See Section VI.B.1, Subscriber Growth, *infra*.

¹⁴⁷ The first auction was for two license blocks of 30 megahertz each. FCC Grants 99 Licenses For Broadband Personal Communications Services In Major Trading Areas, *News Release*, FCC, Jun. 23, 1995. The Commission has had five additional broadband PCS auctions. See FCC, *Auctions Home* (visited Apr. 29, 2003) <<http://wireless.fcc.gov/auctions/>>. Three licenses were also awarded as part of a pioneer preference program in 1994. Three Pioneer Preference PCS Applications Granted, *News Release*, FCC, Dec. 14, 1994.

¹⁴⁸ The Commission's broadband PCS allocation includes 20 megahertz of spectrum at 1910 MHz - 1930 MHz for unlicensed broadband PCS.

¹⁴⁹ Major Trading Areas are Material Copyright (c) 1992 Rand McNally & Company. Rights granted pursuant to a license from Rand McNally & Company through an arrangement with the Federal Communications Commission. Rand McNally's MTA specification contains 47 geographic areas covering the 50 states and the District of Columbia. For its spectrum auctions, the Commission has added three MTA-like areas: Guam and the Northern Mariana Islands, Puerto Rico and the U.S. Virgin Islands, and American Samoa. In addition, Alaska was separated from the Seattle MTA into its own MTA-like area. MTAs are combinations of two or more BTAs. See note 24 for a description of BTAs.

¹⁵⁰ In June 1998, broadband PCS C block licensees were permitted to elect to disaggregate their licenses and return 15 megahertz of C block spectrum to the Commission. As a result, a number of licensees elected to disaggregate some or all of their licenses, creating some BTAs with seven broadband PCS spectrum licenses. See Amendment of the Commission's Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licensees, *Second Report and Order and Further Notice of Proposed Rule Making*, 12 FCC Rcd 16436 (1997); Amendment of the Commission's Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licensees, *Order on Reconsideration of the Second Report and Order*, 13 FCC Rcd 8345 (1998). In (continued....)

72. The most recent broadband PCS auction (Auction No. 58) was completed in the past year. On February 15, 2005, the Commission completed the auction of 242 broadband PCS licenses comprising CMRS spectrum that had been offered previously in other auctions but was returned to the Commission as a result of license cancellation or termination.¹⁵¹ In that auction, 24 bidders won 217 licenses, raising (in net high bids) a total of more than \$2.0 billion.

73. SMR - The Commission first established SMR in 1979 to provide for land mobile communications on a commercial basis. The Commission initially licensed spectrum in the 800 and 900 MHz bands for this service, in non-contiguous bands, on a site-by-site basis.¹⁵² The Commission has since licensed additional SMR spectrum through auctions.¹⁵³ In total, the Commission has licensed 19 megahertz of SMR spectrum, plus an additional 7.5 megahertz of spectrum that is available for SMR as well as other services.¹⁵⁴ While Commission policy permits flexible use of this spectrum, including the provision of paging, dispatch, mobile voice, mobile data, facsimile, or combinations of these services,¹⁵⁵ the primary use for SMR traditionally has been trunked dispatch services.¹⁵⁶ Dispatch differs from

(Continued from previous page) —————

August 2000, the Commission decided to reconfigure each 30 megahertz C block license available for auction, beginning with Auction No. 35, into three 10 megahertz licenses. Amendment of the Commission's Rules Regarding Installment Payment Financing for Personal Communications Services (PCS) Licensees, *Sixth Report and Order and Order on Reconsideration*, 15 FCC Rcd 16266, 16267 (2000).

¹⁵¹ Broadband PCS Spectrum Auction Closes, *Public Notice*, 20 FCC Rcd 3703 (2005). Some of the spectrum to be re-auctioned was returned as a result of the settlement agreement between the FCC and NextWave. See *Ninth Report*, at 20630.

¹⁵² The "900 MHz" SMR band refers to spectrum allocated in the 896-901 and 935-940 MHz bands; the "800 MHz" band refers to spectrum allocated in the 806-824 and 851-869 MHz bands. See 47 C.F.R. § 90.603; see also 47 C.F.R. § 90.7 (defining "specialized mobile radio system").

¹⁵³ The Commission has held multiple auctions for SMR licenses. FCC, *FCC Auctions* (visited Mar. 7, 2002) <<http://wireless.fcc.gov/auctions/>>.

¹⁵⁴ There are five megahertz in the 900 MHz band (200 paired channels x 12.5 kHz/channel). See 47 C.F.R. § 90.617, Table 4B. There are 21.5 megahertz in the 800 MHz band: 14 megahertz in the 800 SMR Service (280 paired channels x 25 kHz/channel) and 7.5 megahertz in the 800 MHz General Category (150 paired channels x 25 kHz/channel). See 47 C.F.R. § 90.615, Table 1 (SMR General Category) and 47 C.F.R. § 90.617, Table 4A (SMR Service). In 2000, the Commission amended its rules to allow Business and Industrial/Land Transportation licensees in the 800 MHz band to use their spectrum for CMRS operations under certain conditions. Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended Promotion of Spectrum Efficient Technologies on Certain Part 90 Frequencies; Establishment of Public Service Radio Pool in the Private Mobile Frequencies Below 800 MHz; Petition for Rule Making of The American Mobile Telecommunications Association, *Report and Order and Further Notice of Proposed Rule Making*, 15 FCC Rcd 22709, 22760-61 (2000). This could make up to five megahertz of additional spectrum available for digital SMR providers: 2.5 megahertz in the Industrial/Land Transportation Category (50 paired channels x 25 kHz/channel) and 2.5 megahertz in the Business Category (50 paired channels x 25 kHz/channel). See 47 C.F.R. § 90.617, Tables 2A and 3A. As discussed below in Section III.E.1.b, *infra*, the configuration of the 800 MHz band is changing as a result of a new band plan adopted by the Commission.

¹⁵⁵ Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, *Policy Statement*, 14 FCC Rcd 19868 (1999); see also Applications of Various Subsidiaries and Affiliates of Geotek Communications, Inc., Debtor-In-Possession, Assignors, and Wilmington Trust Company or Hughes Electric Corporation, Assignees, For Consent to Assignment of 900 MHz Specialized Mobile Radio Licenses, *Memorandum Opinion and Order*, 15 FCC Rcd 790, 802 (2000).

¹⁵⁶ Dispatch services allow two-way, real-time, voice communications between fixed units and mobile units (e.g., between a taxicab dispatch office and a taxi) or between two or more mobile units (e.g., between a car and a truck). See *Fifth Report*, at 17727-17728, for a detailed discussion. A number of providers continue to provide both (continued....)

mobile voice communications offered by PCS and cellular carriers in that it allows both one-to-one and one-to-many communication (including real-time conferencing with groups), and it generally does not operate through interconnection with the public switched telephone network.¹⁵⁷ SMR systems have also had the ability to offer interconnected service, but until the development of digital technologies, analog SMR systems had limited capacity to provide mobile telephone services. In recent years, however, the nature of SMR service has evolved significantly. SMR providers such as Nextel and SouthernLINC Wireless, a unit of energy concern Southern Company, have used digital technologies to increase spectral efficiency and to become more significant competitors in mobile telephony, while also providing dispatch functionality as a part of their service offerings.¹⁵⁸ Furthermore, in apparent response to the dispatch functionality of SMR services, some cellular and broadband PCS carriers have begun to offer push-to-talk functionality on their networks, including Verizon Wireless, Sprint PCS, and ALLTEL.¹⁵⁹ SMR spectrum is also used for certain data-only networks.¹⁶⁰

74. Available Licenses and Spectrum Aggregation – In every geographical area of the country, the Commission initially authorized up to eight different mobile telephone licenses (two cellular and six broadband PCS), not including additional digital SMR licenses.¹⁶¹ Moreover, under Commission rules, broadband PCS, cellular, and auctioned SMR licensees may, with Commission approval, disaggregate (divide the spectrum into smaller amounts of bandwidth) or partition (divide the license into smaller geographical areas) their licenses, or both, to other entities.¹⁶² Many licensees hold more than one license in a particular market. While no longer in operation, the Commission's CMRS spectrum cap molded the current distribution of spectrum licenses. Under the spectrum cap, no entity could control more than 45 megahertz of cellular, broadband PCS, and SMR¹⁶³ spectrum in an MSA, or more than 55 megahertz in an RSA.¹⁶⁴ In November 2001, however, the Commission raised the spectrum cap to 55

(Continued from previous page) —————

commercial and private dispatch services at 800 MHz, 900 MHz, 220 MHz, 217-219 MHz, and 450-470 MHz. See Applications of Motorola, Inc.; Motorola SMR, Inc.; and Motorola Communications and Electronics, Inc. Assignors; and FCI 900, Inc., Assignee, For Consent to Assignment of 900 MHz Specialized Mobile Radio Licenses, *Order*, 16 FCC Rcd 8451 (2001) (“*Motorola Order*”). Dispatch and SMR are often used interchangeably, although SMR refers to specific spectrum ranges.

¹⁵⁷ See The Strategis Group, *The State of the SMR Industry: Nextel and Dispatch Communications*, Sept. 2000, at 57; The Strategis Group, *U.S. Dispatch Markets*, Jan. 2000, at 1. See also *Motorola Order*, at 8457.

¹⁵⁸ According to Nextel, “[We are] referred to as an ‘SMR provider’ . . . , although [our] services compete directly with and are regulated virtually identically to those of cellular and PCS providers.” Nextel, Automatic and Manual Roaming Obligations Pertaining to Commercial Mobile Radio Services, WT Docket No. 00-193, *Comments*, at note 4 (filed Jan. 5, 2001). However, in comparison with cellular and broadband PCS providers, digital SMR providers are more focused on the business than the individual consumer market. See, e.g., Nextel Communications, Inc., SEC Form 10-Q, Nov. 14, 2000, at 16.

¹⁵⁹ *Ninth Report*, at 20634.

¹⁶⁰ See Section IV.B.1.e, Data-Only Networks and Technology Deployment, *infra*.

¹⁶¹ Some areas may have fewer than eight active licenses because certain auction winners or licensees have defaulted on payments to the Commission, because some licensees did not meet their buildout requirements, some licensees returned their licenses, or some licenses remained unsold in an auction.

¹⁶² 47 C.F.R. § 24.714 (PCS); 47 C.F.R. § 22.948 (cellular); 47 C.F.R. §§ 90.813 and 90.911 (auctioned SMR). As a result of partitioning and disaggregation, there often are more than eight cellular and broadband PCS licenses in a market.

¹⁶³ No more than 10 megahertz of SMR spectrum was attributable to an entity under the cap. 47 C.F.R. § 20.6(b).

¹⁶⁴ 47 C.F.R. § 20.6(a).

megahertz in all markets, and decided to eliminate the restriction entirely effective January 1, 2003.¹⁶⁵

b. 800 MHz Band Reconfiguration and 1.9 GHz Spectrum Exchange

75. On July 8, 2004, the Commission adopted a new band plan for the 800 MHz band to resolve the problem of interference to public safety radio systems operating in the band from CMRS providers operating systems on channels in close proximity to those utilized by public safety entities.¹⁶⁶ The new band plan addresses the root cause of the interference problem by separating generally incompatible technologies, with the costs of relocating 800 MHz incumbents to be paid by Nextel. To accomplish the reconfiguration, the Commission will require Nextel to give up rights to certain of its licenses in the 800 MHz band and all of its licenses in the 700 MHz band. In exchange, the Commission will modify Nextel's licenses to provide the right to operate on two five-MHz blocks in the 1.9 GHz band – specifically 1910-1915 MHz and 1990-1995 MHz – conditioned on Nextel fulfilling certain obligations specified in the Commission's decision. As a new entrant in the 1.9 GHz band, Nextel is also obligated to fund the transition of incumbent users to comparable facilities. The Commission determined that the overall value of the 1.9 GHz spectrum is \$4.8 billion, less the cost of relocating incumbent users. In addition, the Commission decided to credit to Nextel the value of the spectrum rights that Nextel will relinquish and the actual costs Nextel incurs to relocate all incumbents in the 800 MHz band. To the extent that the total of these combined credits is less than the assessed value of the 1.9 GHz spectrum rights, Nextel will make an anti-windfall payment equal to the difference to the United States Department of the Treasury at the conclusion of the relocation process.

c. Narrowband Spectrum

76. In addition to the spectrum that mobile telephone carriers use to offer both voice and data CMRS services, two additional spectrum bands – paging and narrowband PCS – are used by licensees to offer CMRS services that consist only of data communications. Spectrum designated for commercial messaging/paging is spread across several non-contiguous bands: 35-36 MHz, 43-44 MHz, 152-159 MHz, 454-460 MHz, and 929-932 MHz.¹⁶⁷ Each license consists of between 20 and 50 kilohertz.¹⁶⁸ The Commission first allocated spectrum for paging in 1949 and licensed the spectrum on a site-by-site basis through the mid-1990s.¹⁶⁹ In 2000 the Commission began auctioning additional paging licenses on a geographic area basis using EAs and MEAs.¹⁷⁰ The Commission completed its third paging auction on May 28, 2003.¹⁷¹

77. Narrowband PCS spectrum is located in the 901-902 MHz, 930-931 MHz, and 940-941

¹⁶⁵ *Spectrum Cap Order*, at 22669. The increase to 55 megahertz took effect February 13, 2002. See 67 Fed. Reg. 1626 (Jan. 14, 2002). All license transfers are still subject to review by the Commission to determine whether they are in the public interest. *Spectrum Cap Order*, at 22670-22671.

¹⁶⁶ FCC Adopts Solution to Interference Problem Faced by 800 MHz Public Safety Radio Systems, *News Release*, Federal Communications Commission, Jul. 8, 2004.

¹⁶⁷ FCC, *Paging (Lower) Bandplan*, <<http://wireless.fcc.gov/auctions/data/bandplans/pagingLwrband.pdf>>; FCC, *929 and 931 MHz Paging Bandplan*, <<http://wireless.fcc.gov/auctions/data/bandplans/auc26bnd.pdf>>.

¹⁶⁸ *Id.*

¹⁶⁹ Revision of Part 22 and Part 90 of the Commission's Rules to Facilitate Future Development of Paging Systems, Implementation of Section 309(j) of the Communications Act – Competitive Bidding, *Notice of Proposed Rulemaking*, 11 FCC Rcd 3108, 3109-3110 (1996).

¹⁷⁰ See 929 and 931 MHz Paging Auction Closes, *Public Notice*, DA 00-508 (rel. Mar. 6, 2000); *Seventh Report*, at 13050-13051.

¹⁷¹ Lower and Upper Paging Bands Auction Closes, *Public Notice*, DA 03-1836 (rel. May 30, 2003).

MHz bands and allows licensees to offer an array of two-way data services such as text messaging.¹⁷² The Commission first auctioned narrowband PCS spectrum in 1994.¹⁷³ Licenses consisted of between 50 and 100 kilohertz each and were offered on both a nationwide and regional basis.¹⁷⁴ The Commission completed its most recent auctions of narrowband PCS licenses in September 2003.¹⁷⁵

d. 700 MHz Bands

78. As discussed in the *Eighth Report*, the 700 MHz spectrum is being reclaimed from use by broadcast services in connection with the transition of the analog television service to digital television.¹⁷⁶ The reclamation of television spectrum has been addressed in two parts, primarily as a result of different statutory requirements applicable to the two bands and differing degrees of incumbency in the two bands.¹⁷⁷ These two bands are the 698-746 MHz (known as the “Lower 700 MHz”) band and the 746-806 MHz (or “Upper 700 MHz”) band. The Upper 700 MHz Band is currently used by TV stations on Channels 60-69 and comprises 60 megahertz, while the Lower 700 MHz Band, which is used by TV stations on Channels 52-59, comprises 48 megahertz of spectrum.¹⁷⁸

79. Seventy-eight megahertz of the total 108 megahertz of Upper and Lower 700 MHz spectrum will generally be open to a broad range of flexible uses.¹⁷⁹ Pursuant to statutory mandate, licenses for this spectrum will be assigned through competitive bidding.¹⁸⁰ These bands have many permissible uses: winning bidders may use the spectrum for fixed, mobile (including mobile wireless commercial services), and broadcast services.¹⁸¹ The Commission expects that many of the new

¹⁷² Implementation of Section 309(j) of the Communications Act – Competitive Bidding Narrowband PCS, PP Docket No. 93-253, *Third Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 10 FCC Rcd 175 (1994).

¹⁷³ Announcing the High Bidders in the Auction of Ten Nationwide Narrowband PCS Licenses; Winning Bids Total \$617,006,674, *Public Notice*, PNWL 94-4 (Aug. 2, 1994).

¹⁷⁴ *Id.*; Announcing the High Bidders in the Auction of 30 Regional Narrowband PCS Licenses; Winning Bids Total \$490,901,787, *Public Notice*, PNWL 94-27 (rel. Nov. 9, 1994).

¹⁷⁵ Regional Narrowband PCS Spectrum Auction Closes, *Public Notice*, DA 03-3006 (rel. Oct. 1, 2003); Narrowband PCS Spectrum Auction Closes, *Public Notice*, DA 03-3012 (rel. Oct. 2, 2003). *See, also, Ninth Report*, at 20636-20637.

¹⁷⁶ *See Eighth Report*, at 14798-14799.

¹⁷⁷ Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), GN Docket No. 01-74, *Notice of Proposed Rulemaking*, 16 FCC Rcd 7278, 7282 (2001).

¹⁷⁸ The Commission has allocated 24 megahertz of the Upper 700 MHz band for use by public safety entities, pursuant to Section 337(a) of the Communications Act. 47 U.S.C. § 337(a).

¹⁷⁹ *See* Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59), GN Docket No. 01-74, *Report and Order*, 17 FCC Rcd 1022 (2002) (“*Lower 700 MHz Report and Order*”); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Third Report and Order*, 16 FCC Rcd 2703 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Second Memorandum Opinion and Order*, 16 FCC Rcd 1239 (2001); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, 15 FCC Rcd 20845 (2000); Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission’s Rules, WT Docket No. 99-168, *Second Report and Order*, 15 FCC Rcd 5299 (2000) (“*Upper 700 MHz Second Report and Order*”).

¹⁸⁰ *See Lower 700 MHz Report and Order*, at 1024; *Upper 700 MHz Second Report and Order*, at 5301-2.

¹⁸¹ *Id.*

technologies to be developed and deployed in this band will support advanced wireless applications.¹⁸² However, much of the Upper and Lower 700 MHz spectrum is currently encumbered by television broadcasters, and may remain so until the end of period when broadcasters convert from analog to digital transmission systems.¹⁸³ That period is defined by statute.¹⁸⁴ Nevertheless, there may be some portions of these bands that are not so encumbered and are available for immediate use by winning bidders.

80. The Balanced Budget Act of 1997 and subsequent legislation initially directed the Commission to license these reclaimed spectrum bands well in advance of the end of the DTV transition period.¹⁸⁵ However, the Auction Reform Act of 2002 eliminated these statutory deadlines¹⁸⁶ and provided the Commission with discretion to “determine the timing of and deadlines for the conduct of competitive bidding under [Section 309(j) of the Communications Act of 1934, as amended], including the timing of, and deadlines for, qualifying for bidding; conducting auctions; collecting, depositing, and reporting revenues; and completing licensing processes and assigning licenses.”¹⁸⁷ The Auction Reform Act further ordered the Commission to delay the A, B, and E block portion of Auction No. 44 (Lower 700 MHz) and the entire Auction No. 31 (Upper 700 MHz), yet it also directed the Commission to proceed with an auction of the Lower 700 MHz C and D blocks starting “no earlier than August 19, 2002, and no later than September 19, 2002.”¹⁸⁸ On September 18, 2002, the initial auction of Lower 700 MHz C and D block licenses (Auction No. 44) closed, raising \$88.7 million in net bids.¹⁸⁹ Subsequent auctions of licenses in these bands (Auction Nos. 49 and 60) in 2003 and 2005 resulted in winning bids for all of the licenses that remained held by the Commission after Auction No. 44 and raised additional net bids of over \$57 million.¹⁹⁰

81. As required by the Auction Reform Act, the Commission prepared a report announcing when it intends to reschedule the remaining 700 MHz band auctions, and submitted the report to Congress on June 19, 2003.¹⁹¹

e. Advanced Wireless Services

82. U.S. mobile carriers have the flexibility to deploy advanced wireless technologies, including those commonly called Third Generation or “3G,” that allow them to offer high-speed mobile data services using their existing CMRS spectrum.¹⁹² To further the goal of promoting the deployment of

¹⁸² *Lower 700 MHz Report and Order*, at 1032.

¹⁸³ *Id.*, at 1028.

¹⁸⁴ See 47 U.S.C. § 309(j)(14)(A)-(B).

¹⁸⁵ Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251 § 3003 (1997) (adding new Section 309(j)(14) to the Communications Act of 1934, as amended); § 3007 (uncodified; reproduced at 47 U.S.C. § 309(j) note 3); Consolidated Appropriations Act, 2000, Pub. L. No. 106-113, 113 Stat. 2502, App. E, § 213, 145 Cong. Rec. H12493-94 (Nov. 17, 1999) (“Consolidated Appropriations Act”); 47 U.S.C. § 309(j)(14)(C)(ii).

¹⁸⁶ Auction Reform Act of 2002, Pub. L. No. 107-195, 116 Stat. 715 (“*Auction Reform Act*”).

¹⁸⁷ 47 U.S.C. § 309(j)(15), as added by the *Auction Reform Act*.

¹⁸⁸ 47 U.S.C. § 309(j)(15)(C)(iii), as enacted by the *Auction Reform Act*.

¹⁸⁹ Lower 700 MHz Band Auction Closes, *Public Notice*, DA 02-2323 (rel. Sept. 20, 2002).. See, also, *Ninth Report*, at 20638.

¹⁹⁰ Lower 700 MHz Band Auction Closes, *Public Notice*, DA 03-1978 (rel. June 18, 2003); Auction of Lower 700 MHz Band Licenses Closes, *Public Notice*, DA 05-2239 (rel. Aug. 5, 2005).

¹⁹¹ Auction Reform Act of 2002, *Report To Congress*, FCC 03-138 (rel. Jun. 19, 2003).

¹⁹² 47 C.F.R §§ 20.901(a) and 24.3.

advanced services, the Commission has made efforts to allocate and license additional spectrum suitable for offering advanced wireless services (AWS).¹⁹³ As noted in the *Eighth Report*, in 2002 the Commission, together with the National Telecommunications and Information Administration (“NTIA”), allocated 90 megahertz of spectrum in the 1710-1755 and 2110-2155 MHz bands that can be used to offer advanced wireless services, including 3G services.¹⁹⁴ In 2004, the Commission allocated an additional twenty megahertz of spectrum in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz bands, and sought comment on service rules for fixed and mobile services, including AWS, in these bands.¹⁹⁵

83. In November 2003, in WT Docket No. 02-353, the Commission released a *Report and Order* adopting service rules for licensed fixed and mobile services, including advanced wireless services, for the 90 megahertz of spectrum at 1710-1755 and 2110-2155 MHz.¹⁹⁶ These service rules include application, licensing, operating and technical rules, and competitive bidding provisions. The Commission determined that this spectrum could be used for any wireless service that is consistent with the spectrum’s fixed and mobile allocations and to license this spectrum under the Commission’s flexible, market-oriented Part 27 rules.¹⁹⁷ In order to meet a variety of needs, including the needs of both large and small service providers, the Commission adopted a band plan for this spectrum employing paired spectrum blocks and Economic Areas (EAs), Regional Economic Areas (REAGs) and Rural Service Areas/Metropolitan Statistical Areas (RSA/MSA) licensing areas. The band plan also permits spectrum to be easily aggregated.

84. The Commission also decided not to impose ownership restrictions (other than those contained in Section 310 of the Communications Act), spectrum aggregation limits, eligibility restrictions, or interim performance requirements. The Commission did determine to limit the lower band (*i.e.*, 1710-1755 MHz band) to mobile transmissions and the upper band (*i.e.*, 2110-2155 MHz band) to base transmissions and established rules to protect co-channel and adjacent channel operations from interference. The Commission also determined to assign licenses for this spectrum using the Commission’s Part 1 competitive bidding rules and award bidding credits of 15 percent for small businesses and 25 percent for very small businesses.¹⁹⁸

¹⁹³ Advanced Wireless Services (AWS) is the collective term we use for new and innovative fixed and mobile terrestrial wireless applications using bandwidth that is sufficient for the provision of a variety of applications, including those using voice and data (such as internet browsing, message services, and full-motion video) content.

¹⁹⁴ *Eighth Report*, at 14801. The Commercial Spectrum Enhancement Act, signed into law on December 23, 2004, establishes a Spectrum Relocation Fund to reimburse federal agencies operating on certain frequencies that have been reallocated to non-federal use, including the 1710-1755 MHz band, for the cost of relocating their operations. See Commercial Spectrum Enhancement Act, Pub. L. No. 108-494, 118 Stat. 3986, Title II (2004).

¹⁹⁵ Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Sixth Report and Order, Third Memorandum Opinion and Order and Fifth Memorandum Opinion and Order*, 19 FCC Rcd 20720 (2004); Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands; Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, WT Docket No. 04-356; WT Docket No. 02-353, *Notice of Proposed Rulemaking*, 19 FCC Rcd 19263 (2004) (*AWS-2 Service Rules NPRM*).

¹⁹⁶ Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, WT Docket No. 02-353, *Report and Order*, 18 FCC Rcd 25162 (2003); *Order on Reconsideration*, FCC 05-149 (rel. Aug. 15, 2005).

¹⁹⁷ 47 C.F.R. Part 27.

¹⁹⁸ In the recently issued Order on Reconsideration involving the AWS band, the Commission has indicated that it plans to examine, in a future proceeding, certain aspects of its rules pertaining to a designated entity’s eligibility for (continued....)

85. The *AWS-2 Service Rules NPRM*, released in September 2004, sought comment on issues specific to the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz bands, and also offered some tentative conclusions consistent with existing AWS service rules, such as allowing flexible use of this spectrum and licensing this spectrum under Part 27 of the Commission's rules. The *NPRM* also sought comment on how best to control in-band and adjacent-band interference. Further, the *NPRM* proposed that the Commission conduct any auction of this spectrum in conformity with the general competitive bidding rules set forth in Part 1 of the Commission's rules and that it use the same small business size standards and associated bidding credits as adopted for broadband PCS and the other 90 megahertz of AWS spectrum.¹⁹⁹

f. Broadband Radio Service

86. In July 2004, the Commission transformed the rules and policies governing the Multipoint Distribution Service (MDS) and the Instructional Television Fixed Service (ITFS) in the 2500-2690 MHz band by providing licensees with greater flexibility and establishing a more functional band plan.²⁰⁰ As one part of this action, the Commission renamed the MDS service the "Broadband Radio Service" (BRS) and renamed the ITFS service the Educational Broadband Service (EBS).

87. The Commission took several steps to restructure the 2495-2690 MHz band and facilitate more efficient use of the spectrum. First, the Commission created a new band plan for the 2495-2690 MHz band that eliminated the use of interleaved channels by MDS and ITFS licensees and created distinct band segments for high power operations, such as one-way video transmission, and low power operations, such as two-way fixed and mobile broadband applications. By grouping high and low power users into separate portions of the band, the new band plan reduces the likelihood of interference caused by incompatible uses and creates incentives for the development of low-power, cellularized broadband operations, which were inhibited by the prior band plan. Second, the Commission expanded the original MDS-ITFS band by adding to it five megahertz of additional spectrum from below 2500 MHz, which will provide room for the future relocation of MDS Channels 1 and 2, which are presently located in the 2.1 GHz band.

88. In addition, the Commission provided licensees with the flexibility to employ the technologies of their choice in the band and to lease spectrum under the Commission's secondary market spectrum leasing policies and procedures. The Commission also implemented geographic area licensing for all licensees in the band, which will allow increased flexibility while reducing administrative burdens on both licensees and the Commission.

89. Finally, the Commission established a mechanism for transition from the existing band configuration to the new band plan. BRS and EBS providers will have a three-year period during which they may propose transition plans for relocating existing facilities of all other licensees within the same

(Continued from previous page) —————

bidding credits. See Service Rules for Advanced Wireless Services In the 1.7 GHz and 2.1 GHz Bands, *Order On Reconsideration*, FCC 05-149 (rel. Aug. 15, 2005), at ¶41.

¹⁹⁹ AWS-2 Service Rules NPRM, 19 FCC Rcd 19263.

²⁰⁰ Amendment of Parts 1, 21, 73, 74, and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational, and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, WT Docket No. 03-66, *Report and Order and Further Notice of Proposed Rulemaking*, 19 FCC Rcd 14165 (2004). The rules for this band were initially established in 1963 but have evolved significantly since that time. In October 2002, three organizations representing MDS and ITFS providers – the Wireless Communications Association International, the National ITFS Association, and the Catholic Television Network (collectively, the Coalition) – submitted a proposal to the FCC requesting that it substantially change the rules governing this band. In April 2003, the FCC released a Notice of Proposed Rulemaking seeking comment on the Coalition proposal and on other ways to foster efficient and effective use of this spectrum.

Major Economic Area (MEA) to new spectrum assignments in the revised band plan. Plan proponents must notify all licensees in the MEA and file their plans with the Commission. The Commission sought comment on alternative transition options for markets in which no transition plan is proposed, including offering new licenses at auction and modifying existing licenses while offering existing licensees tradable instruments that they could use to bid for new licenses.

90. The changes made to the 2495-2690 MHz band should enable BRS/EBS providers to use this spectrum in a more technologically and economically efficient manner. The goal of the new rules is to facilitate the growth of new and innovative wireless technologies and services, including wireless broadband services that have the potential to compete with cable and DSL broadband providers and to extend broadband service to rural and underserved areas.

2. Other Potential Barriers to Entry

91. There are three other types of entry barriers, each of which captures separate dimensions of the difficulty of entering an industry.²⁰¹ The first type consists of the impediment to entry erected by advertising expenditures. Unlike tangible capital, advertising can neither be resold nor otherwise transferred to prospective buyers; such expenditures are irrecoverable or sunk. While the incumbent has already incurred the sunk costs, the entrant has not. Therefore, the entrant has higher incremental cost and incremental risk associated with its decision to enter. The second type of entry barrier arises from economies of scale, which allow firms to lower the cost per unit of producing and distributing a product as the volume of output expands. The more extensive economies of scale are, the larger is the minimum efficient scale relative to the size of the market, meaning a nascent firm risks depressing market price by producing at optimal scale. The alternative is to produce at less than minimum cost. Either way, expected profitability is lowered, and entry is dissuaded. The third type of entry barrier, and closely related to the second, is the inability of new firms to borrow sums sufficient to finance efficient start-ups. The inability to borrow sufficiently increases with the larger absolute capital requirement needed to realize minimum cost, erecting a staunch entry barrier.

92. All three types of entry barriers have the potential to afford incumbent carriers first-mover advantages over latecomers. We believe it is probable that the three types of entry barriers are high in mobile telephone service. Telecommunications has historically been an industry characterized by large investments in network infrastructure and vast scale economies, suggesting the scale economy and capital requirement barriers are both high. Increasing advertising expenditures by mobile telephone carriers as they seek to brand their products suggests that the product differentiation barrier in mobile telephone service is similarly high. As documented below in Section IV.B.4 on carrier rivalry with respect to advertising and marketing, total advertising expenditures by the five nationwide operators alone approached \$4 billion in 2004, though advertising expenditures per subscriber fell in 2004 after rising from 2001 to 2003.²⁰² On the other hand, as noted in the *Ninth Report*, CTIA has interpreted the recent subscriber growth achieved by non-cellular entrants such as T-Mobile and Nextel as evidence that first-mover advantages may no longer be relevant to the mobile telephone industry.²⁰³

²⁰¹ See William J. Baumol and Robert D. Willig, *Fixed Cost, Sunk Cost, Entry Barriers and Sustainability of Monopoly*, QUARTERLY JOURNAL OF ECONOMICS, Vol. 96, Aug. 1981, at 406-431; Joe S. Bain, *Barriers to New Competition*, 1956, at 55; William S. Comanor and Thomas A. Wilson, *Advertising Market Structure and Performance*, THE REVIEW OF ECONOMICS AND STATISTICS, Vol. 49, Nov. 1967, at 425.

²⁰² Section IV.B.4, Advertising and Marketing, *infra*.

²⁰³ *Ninth Report*, at 20641.

F. Rural Markets

1. Geographical Comparisons: Urban vs. Rural

93. Since the release of the *Sixth Report*,²⁰⁴ the Commission has attempted to obtain a better understanding of the state of competition below the national level, and particularly in rural areas.²⁰⁵ The Commission does not have a statutory definition of what constitutes a rural area.²⁰⁶ The Commission has used RSAs as a proxy for rural areas for certain purposes, such as the former cellular cross-interest rule and the former CMRS spectrum cap, stating that “other market designations used by the Commission for CMRS, such as [EAs], combine urbanized and rural areas, while MSAs and RSAs are defined expressly to distinguish between rural and urban areas.”²⁰⁷ In its Report and Order concerning deployment of wireless services in rural areas, the Commission adopted a “baseline” definition of rural as a county with a population density of 100 persons or fewer per square mile.²⁰⁸ For this reason, we adopt this same definition to analyze service availability in rural areas for this report.²⁰⁹

2. Rural Competition

94. In comparing competitive entry in counties with population densities of 100 persons per square mile or less to those with densities greater than 100 persons per square mile, we find that the less densely populated counties have an average of 3.7 mobile competitors, while the more densely populated counties have an average of 5.5 competitors. The number of competitors in the less densely populated counties is unchanged from the *Ninth Report*, but the average number of competitors in the more densely

²⁰⁴ *Sixth Report*, at 13350.

²⁰⁵ The Commission held a public forum in February 2002 to discuss, among other things, CMRS competition issues in rural areas. In 2003, the Commission released a *Notice of Proposed Rulemaking* in 2003 to examine ways to promote the rapid and efficient deployment of spectrum-based services in rural areas. Facilitating the Provision of Spectrum-Based Service to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services, *Notice of Proposed Rulemaking*, 18 FCC Rcd 20802 (2003) (“*Rural NPRM*”). In addition, the *Eighth CMRS NOI* included questions on a range of rural wireless issues.

²⁰⁶ The federal government has multiple ways of defining rural, reflecting the multiple purposes for which the definitions are used. *Eighth Report*, at 14834; *Rural NPRM*, at 20808-11. Similarly, in its *Ninth CMRS NOI*, the Commission asked for comments on how the Commission should define “rural areas” for purposes of the *Ninth Report*. *Ninth CMRS NOI*, at 5615-5616.

²⁰⁷ Biennial Regulatory Review, Spectrum Aggregation Limits for Wireless Telecommunications Carriers, *Report and Order*, 15 FCC Rcd 9219, 9256 at note 203 (1999).

²⁰⁸ Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum-Based Services, *Report and Order*, 19 FCC Rcd. 19078, at 19087-19088 (2004) (“We recognize, however, that the application of a single, comprehensive definition for ‘rural area’ may not be appropriate for all purposes. . . Rather than establish the 100 persons per square mile or less designation as a uniform definition to be applied in all cases, we instead believe that it is more appropriate to treat this definition as a presumption that will apply for current or future Commission wireless radio service rules, policies and analyses for which the term ‘rural area’ has not been expressly defined. By doing so, we maintain continuity with respect to existing definitions of ‘rural’ that have been tailored to apply to specific policies, while also providing a practical guideline.”).

²⁰⁹ We note that this definition was supported by many of the commenters responding to the *Ninth Report NOI*. See *Ninth Report*, note 266, at 20642. In the *Eighth Report*, the Commission analyzed service availability in rural areas using three different proxy definitions, and similar results were obtained for each definition. *Eighth Report*, at 14835-37.

populated counties has declined 7 percent from 5.9 competitors.²¹⁰

3. Conclusion

95. Based on our rollout analysis and information provided by commenters, we conclude that CMRS providers are competing effectively in rural areas.²¹¹ While it appears that, on average, a smaller number of operators are serving rural areas than urban areas, this structural difference is not, by itself, a sufficient basis for concluding that CMRS competition is not effective in rural areas. To the contrary, market structure is only a starting point for a broader analysis of the status of competition based on the totality of circumstances, including the pattern of carrier conduct, consumer behavior, and market performance as discussed more fully below. Despite the smaller number of mobile operators in rural areas as compared to urban areas, there is no evidence in the record to indicate that this structural difference has enabled carriers in rural areas to raise prices above competitive levels or to alter other terms and conditions of service to the detriment of rural consumers. In addition, data and statements presented by commenters on the *Tenth CMRS PN* support the conclusion that there is effective competition with respect to CMRS in rural areas.²¹²

IV. CARRIER CONDUCT IN THE MOBILE TELECOMMUNICATIONS MARKET

96. A concentrated market, in conjunction with significant entry barriers, may lessen competition in the market for commercial mobile services in two distinct ways. First, it may increase the likelihood that a group of competing carriers will successfully engage in coordinated interaction aimed at raising prices and lowering output. Second, it may enable an individual carrier to profitably raise price and lower output unilaterally. However, neither coordinated interaction nor unilateral action to lessen competition is a necessary consequence of market concentration and entry barriers. For example, unilateral or coordinated action to lessen competition may be thwarted or undermined by the presence of one or more maverick carriers who have the ability and incentive to expand sales by undercutting the prices of rivals, offering innovative service packages and engaging in aggressive advertising and promotional campaigns.²¹³ The analysis of carrier conduct thus focuses on whether incumbent carriers, given the prevailing market structure, engage in intense price and non-price rivalry or instead behave in a friendly manner.

A. Price Rivalry

1. Developments in Mobile Telephone Pricing Plans

97. The continued rollout of differentiated pricing plans also indicates a competitive marketplace. In the mobile telephone sector, we observe independent pricing behavior, in the form of continued experimentation with varying pricing levels and structures, for varying service packages, with

²¹⁰ *Ninth Report*, at 20643.

²¹¹ See, e.g., CTIA Comments, at 15-16 (“the wireless industry has a tremendous and unprecedented track record in rapidly bringing high-quality, affordable telecommunications services to consumers located in rural areas”); T-Mobile Reply Comments, at 6 (“T-Mobile and other wireless providers have demonstrated in recent Commission proceedings that there is significant wireless competition in rural areas”).

²¹² See, e.g., CTIA Comments, at 21 (“in 2004, the Bureau of Labor Statistics found that 50.5% of rural households have wireless service, versus 53.5% of urban households”) (Data cited in Joseph S. Kramer, *et al.*, “The Myths and Realities of Universal Service: Revisiting the Justification for the Current Subsidy Structure,” PFF, January 2005, at 17 and 121).

²¹³ An example is when AT&T introduced its digital-one-rate plan in May 1998, which was the first plan to include a large quantity of monthly minutes at a fixed rate and no long distance charges when used on the operator’s network. See *Fourth Report*, at 10155, and *Fifth Report*, at 17677-78.

various handsets and policies on handset pricing.²¹⁴ AT&T Wireless's Digital One Rate plan, introduced in May 1998, is one notable example of an independent pricing action that altered the market to the benefit of consumers.²¹⁵ Today all of the nationwide operators offer some version of a national rate pricing plan in which customers can purchase a bucket of minutes to use on a nationwide or nearly nationwide network without incurring roaming or long-distance charges.

98. Since 2003, U.S. providers have stepped up efforts to take on more customers through "family plan" packages.²¹⁶ In family plan offerings, subscribers sign up for two lines and then have the option of adding additional lines at reduced prices. The lines share the available minutes on the plan jointly. All the nationwide carriers now offer family plans, with the initial two lines usually costing at least \$60 a month, and each additional line costing an extra \$10 to \$20.²¹⁷ One report explained the attractiveness of such plans to carriers: "Family plans were designed to add new customers cheaply by encouraging people to give phones to their children or older relatives as carriers race to sign up the remaining roughly 40 percent of the population that do not already have cellphones. These plans tend to bring in less revenue per user than single accounts but the hope is that whole families are less inclined than individuals to switch to rival services and that children will stay loyal to the operator as they get older."²¹⁸

2. Prepaid Service

99. In the United States, most mobile telephone subscribers pay their phone bills after they have incurred charges (known as postpaid service). Prepaid service, in contrast, requires customers to pay for a fixed amount of minutes prior to making calls. Although prepaid plans are considered a good way to increase penetration rates, they typically produce lower ARPUs and higher churn rates in comparison to postpaid service.²¹⁹ For these reasons, the industry generally has not heavily promoted prepaid offerings in the past.²²⁰ However, the pool of unsubscribed customers qualified for postpaid plans²²¹ has declined to the point where prepaid offerings, which do not require credit checks, seem more attractive to

²¹⁴ We also note that early termination fees are a widespread phenomenon in the marketplace. The Commission has initiated two separate proceedings on this matter. See "Wireless Telecommunications Bureau Seeks Comment on Petition for Declaratory Ruling Filed by CTIA Regarding Whether Early Termination Fees are 'Rates Charged' Within 47 U.S.C. Section 332(c)(3)(A)," *Public Notice*, 20 FCC Rcd 9100 (2005); "Wireless Telecommunications Bureau Seeks Comment on Petition for Declaratory Ruling Filed by SunCom, and Opposition and Cross-Petition for Declaratory Ruling Filed by Debra Edwards, Seeking Determination of Whether State Law Claims Regarding Early Termination Fees are Subject to Preemption Under 47 U.S.C. Section 332(c)(3)(A)," *Public Notice*, 20 FCC Rcd 9103 (2005).

²¹⁵ See *AT&T Launches First National One-Rate Wireless Service Plan*, News Release, AT&T Corp., May 7, 1998.

²¹⁶ *Family Plans Reflect Slowing Cell Growth*, REUTERS, Mar. 27, 2005.

²¹⁷ Phil Cusick and Richard Choe, *Wireless Growth: It's a Family Affair*, Bear Stearns, Equity Research, Jan. 26, 2005, at 4.

²¹⁸ *Family Plans Reflect Slowing Cell Growth*, REUTERS, Mar. 27, 2005.

²¹⁹ *Diamond in the Rough*, at 5. But prepaid subscribers have lower levels of bad debt, are cheaper to acquire, and pay more on a per-minute basis than postpaid subscribers. *Id.*, at 5. "Prepaid offerings will almost certainly have a detrimental effect on key wireless metrics such as ARPU, churn and MOUs. Ultimately, however, if prepaid service can add to profitability and free cash flow and generate a respectable return on investment, it is worth pursuing." *Id.*, at 6.

²²⁰ *Pay First*, Yuki Noguchi, *The Push Behind Prepaid*, WASHINGTON POST, June 2, 2005, at D01 ("The Push Behind Prepaid").

²²¹ Only about 58 percent of the US population has prime credit. *Diamond in the Rough*, at 4.

carriers.²²² In response, some carriers have introduced new prepaid plans, or entire brands.²²³ In some cases, they are tailoring their offerings to suit segments of the market that do not want or cannot get a traditional cellular plan, particularly the youth market.²²⁴ One survey found that 39 percent of teen cell phone users use prepaid plans.²²⁵

100. The result of these efforts has been a significant rise in the percentage of wireless users who subscribe to prepaid plans. Analysts estimate the prepaid base to represent between 8 and 11 percent of U.S. subscribers at the end of 2004,²²⁶ a substantial increase from the figure of 6 percent reported here for the last two years.²²⁷ Among the nationwide carriers, T-Mobile had 11.4 percent of its subscribers on prepaid plans, Cingular Wireless had 7 percent, and Verizon Wireless had 5.5 percent.²²⁸ Nextel offers prepaid plans through its subsidiary brand, Boost Mobile; Sprint PCS does not offer prepaid plans itself, but partners with third-party resellers to market prepaid offerings.²²⁹

3. Mobile Data Pricing

101. As noted in the *Ninth Report*, handset-based mobile data applications such as text messaging, multimedia messaging services, ringtones, and games are marketed to consumers primarily as an add-on to mobile voice service.²³⁰ During the past year carriers continued to experiment with a mix of different methods for pricing such handset-based mobile data services, including pricing based on kilobytes consumed, a flat rate for each use or download of an application (“pay-as-you-go”), volume discounts on packages or bundles of an application, and unlimited use pricing.²³¹ Use of these pricing options varies by type of application as well as by provider, with providers frequently offering customers a choice of pricing options for a particular application. In addition to allowing customers to purchase particular applications on a stand-alone or *a la carte* basis, carriers also offer bundled offerings that include various types and combinations of mobile data services. As in the past, mobile data pricing continues to be characterized by considerable complexity due to the diversity of pricing options.²³²

²²² *Pay First*. However, not all carriers find prepaid that attractive. According to Verizon Wireless, “we want our customers to be postpaid...It’s a better business proposition.” *Id.*

²²³ See Section III.B.2, Resale/MVNO Providers, *supra*. According to one analyst, “each of the major carriers has recently launched or re-launched its prepaid service, which is another move to increase penetration of lower income brackets at the expense of ARPU and margins.” Simon Flannery and Vance Edelson, *Wireless Carriers Susceptible to Slowing Industry Growth*, Morgan Stanley, Equity Research, May 25, 2005, at 2.

²²⁴ *Pay First*. See, also, *The Push Behind Prepaid* (“In the next year, companies plan introductions of a slew of services offering some form of prepaid service”).

²²⁵ COMMUNICATIONS DAILY, Aug. 13, 2004, at 10 (citing a Coinstar Teen Poll).

²²⁶ John Byrne, *Kagan Wireless Projections 2004-2014*, KAGAN WIRELESS MARKET STATS, May 27, 2005, at 3 (10.8 percent); *Diamond in the Rough*, at 4 (10 percent); Jason Armstrong, *et al.*, *Shades of Grey in Prepaid*, Goldman Sachs, Equity Research, Apr. 12, 2005, at 1 (8 percent).

²²⁷ *Ninth Report*, at 20654; *Eighth Report*, at 14830.

²²⁸ David Janazzo *et al.*, *US Wireless Matrix 4Q04*, Merrill Lynch, Equity Research, Mar. 4, 2005, at 17 (“*US Wireless Matrix 4Q04*”).

²²⁹ See Section III.B.2, Resale/MVNO Providers, *supra*.

²³⁰ *Ninth Report*, at 20645.

²³¹ *Id.*, at 20646.

²³² *Id.* See, also, Sandeep Junnarkar, *A Dizzying Array of Options for Using the Web on Cellphones*, NEW YORK TIMES, June 23, 2005 (“*Options for Using the Web on Cellphones*”).

102. Communications data services such as text messaging, photo messaging, and other multimedia messaging services tend to be priced in similar ways. All the nationwide carriers allow customers to send and receive text messages on a pay-as-you-go basis for a flat rate per message sent or received, and in addition they typically offer customers the option of purchasing text messaging packages for a fee that affords customers a lower unit price per message as compared with the flat pay-as-you-go rate.²³³ Similarly, Cingular and T-Mobile offer photo messaging on both a pay-as-you-go basis and in discounted packages, albeit at higher rates per message as compared with text messaging.²³⁴ Other carriers also offer unlimited text messaging or photo messaging for a flat monthly fee.²³⁵ In addition to *a la carte* offerings, some carriers include various packages and combinations of text and multimedia messaging services as part of a bundled offering with a monthly mobile Internet access service plan and other mobile data services.²³⁶

103. As indicated in the *Ninth Report* carriers have tended to move away from kilobyte-based pricing of handset-based mobile data applications in favor of other pricing methods.²³⁷ However, some carriers continue to use kilobyte-based pricing for downloadable applications such as ringtones, graphics, and games. For example, Cingular and Sprint charge customers for the kilobytes consumed to download a game or ringtone.²³⁸ The kilobyte-based charge is on top of a one-time fee to download a game or ringtone and use it for an unlimited period. Other carriers, such as T-Mobile, typically charge just a one-time fee to purchase a ringtone or game.²³⁹ Some carriers offer other pricing options for downloadable applications. For example, in addition to a one-time fee for unlimited use of a game, Verizon Wireless offers customers the option of paying a lower fee for a monthly subscription to the game.²⁴⁰

104. Aside from handset-based applications, carriers offer monthly mobile Internet access service packages for data users who access the Internet through laptops or Personal Digital Assistants (“PDAs”). The nationwide carriers continue to price mobile Internet access service packages in two

²³³ Cingular Wireless, *Media and Services* (visited May 26, 2005) <www.cingular.com>; Sprint, *Sprint PCS Vision* (visited May 26, 2005) <www.sprintpcs.com>; T-Mobile USA, *Services & Features* (visited May 26, 2005) <www.t-mobile.com>; Verizon Wireless, *Get It Now* (visited May 26, 2005) <www.verizonwireless.com>; Nextel, *Services* (visited June 16, 2005) <www.nextel.com>. Some carriers provide more specific information about pricing structures on their web sites than others. In cases where carrier web sites were less informative, phone calls to customer service representatives provided the basis for statements about the data pricing methods used by certain carriers.

²³⁴ Cingular Wireless, *Media and Services* (visited May 26, 2005) <www.cingular.com>; T-Mobile USA, *Services & Features* (visited May 26, 2005).

²³⁵ Sprint, *Sprint PCS Vision* (visited May 26, 2005) <www.sprintpcs.com>; Nextel, *Services* (visited June 16, 2005) <www.nextel.com>.

²³⁶ Cingular Wireless, *Media and Services* (visited May 26, 2005) <www.cingular.com>; Sprint, *Sprint PCS Vision* (visited May 26, 2005) <www.sprintpcs.com>; Nextel, *Services* (visited June 16, 2005) <www.nextel.com>. See also, *Options for Using the Web on Cellphones*.

²³⁷ *Ninth Report*, at 20646. See also, *Options for Using the Web on Cellphones*.

²³⁸ Cingular Wireless, *Media and Services* (visited May 26, 2005) <www.cingular.com>; Sprint, *Sprint PCS Vision* (visited May 26, 2005) <www.sprintpcs.com>. See also, *Options for Using the Web on Cellphones* (noting that Cingular Wireless, in contrast to other carriers, offers metered wireless data plans that price usage based on the number of megabytes downloaded).

²³⁹ T-Mobile USA, *Services & Features* (visited May 26, 2005) <www.t-mobile.com>.

²⁴⁰ Verizon Wireless, *Get It Now* (visited May 26, 2005) <www.verizonwireless.com>.

principal ways: based on the amount of megabytes consumed each month, or unlimited use pricing.²⁴¹ As noted in the *Ninth Report*, under the megabyte-based pricing scheme, the monthly rate per package increases with the amount of megabytes included in the package, but the volume discounts provided by larger packages result in a progressively lower price per megabyte.²⁴²

B. Non-Price Rivalry

105. Service providers in the mobile telecommunications market also compete on non-price characteristics such as coverage, quality of service, and ancillary services. Non-price competition is a response to consumer preferences and demand. Indicators of non-price rivalry include advertising and marketing, capital expenditures, technology deployment and upgrades, and the provision of ancillary services.

1. Technology Deployment and Upgrades

a. Overview

106. The subject of technology deployment and upgrades by U.S. mobile telecommunications carriers is properly analyzed under the heading of carrier conduct because of the Commission's market-based approach to managing spectrum for commercial mobile voice and data services. In particular, the Commission's policies allow mobile telecommunications carriers the freedom to choose among the various standards for second-generation and more advanced network technologies that are identified and described below. In contrast, the European Community mandated a single harmonized standard for second-generation mobile telecommunications services, and has also adopted a single standard for third-generation services.²⁴³ Thanks to the flexibility afforded by the Commission's market-based approach, different U.S. carriers have chosen a variety of different technologies and associated technology migration paths, and competition among multiple incompatible standards has emerged as an important dimension of non-price rivalry in the U.S. mobile telecommunications market and a distinctive feature of the U.S. mobile industry model.

107. Theory and evidence suggest that allowing the use of multiple standards may have several pro-competitive advantages over standardization of wireless network technologies. Since the types of services tend to differ across technologies, use of multiple standards may result in greater product variety and greater differentiation of services offered by carriers using different technologies.²⁴⁴ Diversified and heterogeneous services make it more difficult for carriers to coordinate their behavior so as to restrict competition with regard to pricing. Other potential pro-competitive advantages of multiple standards include greater technological competition and greater price competition between operators using different technologies.²⁴⁵ In particular, competition between carriers using competing incompatible

²⁴¹ Cingular Wireless, *Data Connect* (visited June 16, 2005) <www.cingular.com>; Sprint, *Wireless Data* (visited June 16, 2005) <www.sprintpcs.com>; T-Mobile, *Internet Rate Plans* (visited June 16, 2005) <www.t-mobile.com>; Nextel, *Data Access* (visited June 16, 2005) <www.nextel.com>; Verizon Wireless, *Wireless Internet BroadbandAccess* (visited June 17, 2005) <www.verizonwireless.com>.

²⁴² *Ninth Report*, at 20648.

²⁴³ Neil Gandal, David Salant, and Leonard Waverman, *Standards in Wireless Telephone Networks*, TELECOMMUNICATIONS POLICY, Vol. 27, 2003 ("Standards in Wireless Telephone Networks"). The authors note that, although the European Community backed away from mandating a single standard for third-generation services, the absence of a mandate has had little practical effect as all European mobile operators have opted for the same standard and migration path. *Id.*, at 330.

²⁴⁴ *Id.*, at 329-330.

²⁴⁵ *Id.*

technologies tends to put pressure on carriers to achieve sufficiently high adoption of their technology in order to ensure it survives the “standards war.”²⁴⁶ The pressure to fill their networks may lead carriers to enact price cuts and handset subsidies.²⁴⁷ Finally, the adoption of a particular standard may enable one carrier, or a subset of carriers, to gain a temporary competitive advantage over rival carriers, which may also tend to undermine the incentive and the ability of carriers to coordinate their conduct in such a way as to restrict competition.

108. The following analysis of technology deployment and upgrades is divided into four parts. As background to examining the particular technological choices made by different carriers, Section IV.B.1.b provides an introduction to cellular network design and technology and identifies and describes the major digital technologies and associated migration paths. Section IV.B.1.c examines the specific technological choices made by mobile carriers that use the same spectrum bands, network design and technologies to offer both voice and data services. Section IV.B.1.d examines the impact of these choices on coverage by technology type. Finally, Section IV.B.1.e examines the technology deployment decisions of carriers with regard to data-only networks and services.

b. Background on Network Design and Technology

109. Cellular, PCS, and digital SMR networks use the same basic design. All use a series of low-power transmitters to serve relatively small areas (“cells”), and reuse spectrum to maximize efficiency.²⁴⁸ In the past, cellular and SMR networks used an analog technology, while PCS networks were designed from the start to use a digital format. Digital technology provides better sound quality and increased spectral efficiency than analog technology. From a customer’s perspective, digital service in the cellular band or SMR bands is virtually identical to digital service in the PCS band. Digital technology is now dominant in the mobile telephone sector, with approximately 97 percent of all wireless subscribers using digital service.²⁴⁹

110. The four main digital technologies used in the United States are: Code Division Multiple Access (“CDMA”), Global System for Mobile Communications (“GSM”), integrated Digital Enhanced Network (“iDEN”), and Time Division Multiple Access (“TDMA”). These four technologies are commonly referred to as Second Generation, or “2G,” because they succeeded the first generation of analog cellular technology, Advanced Mobile Phone Systems (“AMPS”).²⁵⁰ As discussed in the *Seventh Report*, in light of industry developments this report no longer distinguishes between TDMA and GSM networks in its analysis of digital coverage, but considers the two as one migration path towards more

²⁴⁶ Carl Shapiro and Hal R. Varian, *Information Rules*, Harvard Business School Press, 1999, at 261-296; Simon Flannery *et al.*, *3G Economics a Cause for Concern*, Morgan Stanley, Equity Research, Feb. 1, 2005, at 11 (“*3G Economics a Cause for Concern*”).

²⁴⁷ *3G Economics a Cause for Concern*, at 10-11.

²⁴⁸ PCS, digital SMR, and cellular networks are all “cellular” systems since all divide service regions into many small areas called “cells.” Cells can be as small as an individual building or as large as 20 miles across. Each cell serves as a base station for mobile users to obtain connection to the fixed network and is equipped with its own radio transmitters/receivers and associated antennas. Service regions are divided into cells so that individual radio frequencies may be reused in different cells (“frequency reuse”), in order to enhance frequency efficiency. When a person makes a call on a wireless phone, the connection is made to the nearest base station, which connects with the local wireline phone network or another wireless operator. When a person is using a wireless phone and approaches the boundary of one cell, the wireless network senses that the signal is becoming weak and automatically hands off the call to the base station in the next cell. *See Sixth Report*, at 13361, note 55.

²⁴⁹ *See* Section VI.B.1, Subscriber Growth, *infra*.

²⁵⁰ *See* note 260, *infra*, for a discussion of the cellular analog requirement and its sunset.

advanced digital capabilities. The large U.S. carriers intend to phase out TDMA in the foreseeable future; however, we recognize that TDMA as currently deployed will continue to be used by millions of subscribers for a number of years.²⁵¹

111. Beyond the 2G digital technologies, mobile telephone carriers have been deploying next-generation network technologies²⁵² that allow them to offer mobile data services at higher data transfer speeds and, in some cases, to increase voice capacity.²⁵³ For TDMA/GSM carriers, the first step in the migration to next-generation network technologies is General Packet Radio Service (“GPRS” or “GSM/GPRS”), a packet-based data-only network upgrade that allows for faster data rates by aggregating up to eight 14.4 kbps channels.²⁵⁴ Beyond GPRS, most U.S. TDMA/GSM carriers have begun to deploy Enhanced Data Rates for GSM Evolution (“EDGE”) technology, which offers average data speeds of 100-130 kbps. Wideband CDMA (“WCDMA,” also known as Universal Mobile Telecommunications System, or “UMTS”) is the next migration step for GSM carriers beyond EDGE and allows maximum data transfer speeds of up to 2 Mbps and average user speeds of 220-320 kbps.²⁵⁵ Finally, deployment of WCDMA with HSDPA (High Speed Data Packet Access) technology will allow average download speeds of 400-700 kbps with burst rates of up to several Mbps.²⁵⁶

112. Many CDMA carriers have upgraded their networks to CDMA2000 1xRTT (also referred to as “CDMA2000 1X” or “1xRTT”), a technology that doubles voice capacity and delivers peak data rates of 307 kbps in mobile environments and typical speeds of 40-70 kbps.²⁵⁷ The next step in the CDMA migration beyond 1xRTT is CDMA2000 1xEV-DO (evolution-data only, “EV-DO”), which allows maximum data throughput speeds of 2.4 Mbps.²⁵⁸ The more advanced technologies on the CDMA migration path are backwards compatible, whereas WCDMA is incompatible with GSM and TDMA.²⁵⁹

c. Technology Choices and Upgrades of Mobile Telephone Carriers

113. Of the five nationwide mobile telephone operators, Cingular, and T-Mobile use TDMA/GSM as their 2G digital technology, Sprint PCS and Verizon Wireless use CDMA, and Nextel

²⁵¹ See, for example, Cingular Wireless, SEC Form 10-K, filed Mar. 7, 2005, at 70 (stating that “we [will] continue to sell and market TDMA services for the foreseeable future.”). See, also, *Seventh Report*, at 13011.

²⁵² For purposes of this report, all of the network technologies beyond 2G that carriers have deployed, as well as those that they plan to deploy in the future, are generally referred to as “next-generation network technologies.” The International Telecommunication Union (“ITU”) has defined 3G network technologies as those that can offer maximum data transfer speeds of 2 megabits per second (“Mbps”) from a fixed location, 384 kbps at pedestrian speeds, and 144 kbps at traveling speeds of 100 kilometers per hour. See *Fifth Report*, at 17695. There is ambiguity among other industry players, however, as to which network technologies constitute 3G and which constitute interim technologies, often labeled “2.5G.” See *Seventh Report*, at 12990 and 13038. Therefore, this report uses a more general label to describe all of the technologies beyond 2G.

²⁵³ See Section IV.B.1.c, Technology Choices and Upgrades of Mobile Telephone Carriers, *infra*.

²⁵⁴ See *Seventh Report*, at 12990. This upgrade is also labeled GSM/GPRS because many TDMA/GSM carriers are upgrading their TDMA markets with GSM and GPRS simultaneously.

²⁵⁵ *Wireless Broadband Access Task Force Report*, at 25.

²⁵⁶ *Id.*

²⁵⁷ See *Seventh Report*, at 12990; *Ninth Report*, at 20650.

²⁵⁸ *Id.*

²⁵⁹ *Standards in Wireless Telephone Networks*, at 328.

uses iDEN.²⁶⁰ All five nationwide mobile carriers, together with other U.S. mobile carriers, have continued to deploy next-generation network technologies over the past year.

114. Verizon Wireless has deployed 1xRTT technology throughout “virtually all” of its network.²⁶¹ In addition, since October 2003, Verizon has launched EV-DO technology in 31 major U.S. cities, covering over 75 million people.²⁶² With the EV-DO service, subscribers can access the Internet while mobile via a wireless modem card connected to a laptop computer or PDA, or they can download a range of multimedia content and advanced applications on certain mobile handset models.²⁶³ Furthermore, when EV-DO subscribers travel to other parts of the country where EV-DO networks have not been deployed, they can seamlessly roam on and access Verizon’s 1xRTT network because the more advanced technologies on the CDMA migration path are backwards compatible.²⁶⁴ Verizon plans to expand its EV-DO coverage to a total of 150 million people by the end of 2005.²⁶⁵ Verizon reports that its EV-DO delivers average user speeds of 400-700 kbps.²⁶⁶ Other notable EV-DO deployments include launches by Alltel in Akron and Cleveland, OH, and by Midwest Wireless in Olmsted County, MN.²⁶⁷

115. Sprint, the other nationwide CDMA carrier, has deployed 1xRTT across its entire network footprint and began rolling out EV-DO technology in July 2005.²⁶⁸ Sprint initially deployed its EV-DO network to business districts and major airports in 34 U.S. cities. The company plans to expand its EV-DO network to 143 million people by the end of 2005, and to offer EV-DO-based services on a variety of devices in 60 metropolitan areas by early 2006.²⁶⁹ As discussed in the *Ninth Report*, the company announced in June 2004 its plans to deploy EV-DO technology over its network during 2005, rather than wait for 1xEV-DV technology to become commercially available.²⁷⁰ Sprint’s change in strategy with regard to deployment of technologies on the CDMA migration path can be seen as a

²⁶⁰ In addition, all operators using cellular spectrum must deploy AMPS, an analog technology, throughout the part of their networks using cellular spectrum. See 47 C.F.R. §§ 22.901, 22.933. In 2002, the Commission decided to eliminate the requirement after a five-year transition period. Year 2000 Biennial Regulatory Review – Amendment of Part 22 of The Commission’s Rules to Modify or Eliminate Outdated Rules Affecting The Cellular Radiotelephone Service and Other Commercial Mobile Radio Services, *Report and Order*, 17 FCC Rcd 18401, 18414 (2002).

²⁶¹ Verizon Wireless, SEC Form 10-K, filed Mar. 14, 2005, at 3.

²⁶² *On-Demand in the Palm of Your Hand: Verizon Wireless Launches “VCAST” – Nation’s First and Only Consumer 3G Multimedia Service*, Press Release, Verizon Wireless, Jan. 7, 2005; *Verizon Wireless Launches High-Speed Wireless Broadband Network in Tallahassee, Florida Area*, Press Release, Verizon Wireless, Feb. 28, 2005; *Verizon Wireless Extends Rollout of 3G Network in St. Louis, Missouri*, Press Release, Verizon Wireless, June 3, 2005.

²⁶³ *Wireless Broadband Access Task Force Report*, at 25.

²⁶⁴ See *Ninth Report*, at 20652.

²⁶⁵ *Wireless Broadband Access Task Force Report*, at 25.

²⁶⁶ *Verizon Wireless Extends Rollout of 3G Network in St. Louis, Missouri*, Press Release, Verizon Wireless, June 3, 2005.

²⁶⁷ Sue Marek, *Smaller Operators Mull 3G Upgrade*, WIRELESS WEEK, Apr. 15, 2005; Susan Rush, *Midwest Wireless Brings EV-DO to Minnesota*, WIRELESS WEEK, Apr. 21, 2005.

²⁶⁸ See *Ninth Report*, at 20652; *Sprint Begins Launch of EV-DO Wireless High-Speed Data Service*, Press Release, Sprint, July 7, 2005.

²⁶⁹ *Sprint Begins Launch of EV-DO Wireless High-Speed Data Service*, Press Release, Sprint, July 7, 2005.

²⁷⁰ See *Ninth Report*, at 20653.

competitive response to Verizon's EV-DO offering, and thus provides a clear-cut example of intense non-price rivalry.²⁷¹

116. Prior to its merger with Cingular in October 2004, AT&T Wireless had deployed EDGE technology across its entire GSM/GPRS network footprint, covering approximately 215 million people.²⁷² AT&T Wireless had also launched UMTS (or WCDMA) networks in six U.S. cities: Seattle, San Francisco, Phoenix, Detroit, San Diego, and Dallas.²⁷³ After the completion of its acquisition of AT&T Wireless, Cingular incorporated the former AT&T Wireless GSM/GPRS/EDGE and UMTS networks into its GSM/GPRS network footprint.²⁷⁴ In addition, Cingular announced in November 2004 that it plans to deploy UMTS with HSDPA technology in 15-20 major U.S. markets by the end of 2005.²⁷⁵ It has been reported that this upgrade as an effort to compete with Verizon Wireless's EV-DO network, which offers speeds similar to or slightly below HSDPA and faster than UMTS.²⁷⁶

d. Coverage by Technology Type

117. To date, 285 million people, or 99.8 percent of the total U.S. population, live in counties where operators offer digital mobile telephone service, using CDMA, TDMA/GSM, or iDEN (including their respective next generation technologies), or some combination of the three.²⁷⁷ These counties make up 89 percent of the total land area of the United States. To estimate the current levels of deployment of the three main digital mobile telephone technologies individually, we have prepared maps of each technology, which combine the network coverage of all of the relevant operators.²⁷⁸ We have also prepared maps showing the extent of next generation network technology deployment.²⁷⁹

118. CDMA has been launched in at least some portion of counties containing 280 million people, or roughly 98 percent of the U.S. population, while TDMA/GSM has been launched in at least some portion of counties containing 278 million people, or 97 percent of the U.S. population.²⁸⁰ To date, digital SMR operators have launched iDEN-based service in at least some portion of counties containing over 262 million people, or approximately 92 percent of the U.S. population.²⁸¹

119. CDMA 1xRTT and/or 1xEVDO has been launched in at least some portion of counties

²⁷¹ *Id.*

²⁷² See *Ninth Report*, at 20651.

²⁷³ *Id.*

²⁷⁴ As of the end of 2004, Cingular had deployed GSM/GPRS technology across its entire network footprint and 65% of its subscriber base was equipped with GSM/GPRS devices. Cingular Wireless LLC, SEC Form 10-K, filed Mar. 7, 2005, at 8. Just prior to its merger with AT&T Wireless, Cingular had deployed across EDGE technology to two-thirds of its covered network POPs. Cingular Wireless LLC, SEC Form 10-Q, filed Aug. 5, 2004, at 23.

²⁷⁵ Mike Dano, *Cingular Wireless Takes Worldwide HSDPA Lead with DoCoMo Delay*, RCR WIRELESS NEWS, May 16, 2005, at 1.

²⁷⁶ *Id.*

²⁷⁷ Broadband PCS-based and digital SMR-based coverage are estimated using counties, and cellular-based coverage is estimated using CMAs. The caveats mentioned in Section II.B, Sources of Information, and in Section II.C.1, Number of Mobile Telephone Competitors, *supra*, apply to this analysis as well.

²⁷⁸ See Appendix B, Maps 5-8, *infra*.

²⁷⁹ See Appendix B, Map 9, *infra*.

²⁸⁰ See Appendix A, Table 7, *infra*.

²⁸¹ *Id.*

containing 278 million people, or roughly 97 percent of the U.S. population, while GPRS, EDGE, and/or UMTS has been launched in at least some portion of counties containing 267 million people, or about 94 percent of the U.S. population.²⁸²

e. Data-Only Networks and Technology Deployment

120. In addition to the networks discussed above, which mobile telephone carriers use to offer both voice and data services, mobile carriers operate a number of other types of networks in order to provide IP-based broadband, as well as narrowband, data-only commercial mobile services.

121. As mentioned above, since August 2004, Clearwire has launched mobile broadband service in twelve U.S. cities and plans to roll out service to four additional markets in the near future.²⁸³ To offer the service, Clearwire is using OFDM technology developed and manufactured by its equipment subsidiary, NextNet Wireless, and spectrum in the 2.5 GHz BRS/EBS band. Because it allows signals to pass through buildings and trees, OFDM technology enables carriers to offer wireless broadband services without a direct line-of-sight between the transmitter and the receiver.²⁸⁴ Using OFDM technology, Clearwire has eliminated the need for customers to attach an antenna to their rooftop, as is required for most fixed broadband services, and instead allows its subscribers to access the Internet with “plug-and-play” modem devices connected to a personal or laptop computer at downstream speeds ranging from 512 kbps to 1.5 Mbps.²⁸⁵ Customers can transport these devices to other locations where a network signal is available and in some cases use them while traveling at high speeds.²⁸⁶ OFDM-based wireless broadband services also typically eliminate the need for a carrier to send technicians to install equipment at the end user’s house or building.

122. In October 2004, Clearwire announced a partnership with Intel in which Clearwire will deploy equipment based on the 802.16 WiMax standard, of which Intel has been a major proponent and developer.²⁸⁷ WiMax equipment also uses OFDM technology; however, because the equipment will be standardized, it will be interoperable across networks and is expected to be less expensive than proprietary standards.²⁸⁸ Once the 802.16e standard has been finalized, NextNet plans to manufacture end-user equipment that will include 802.16e chipsets manufactured by Intel. The 802.16e version of WiMax will allow wireless broadband services to be offered on a wide-area mobile, rather than a fixed, basis.²⁸⁹

123. As mentioned in the *Ninth Report*, Nextel launched a trial wireless broadband service in

²⁸² See Appendix B, Map 9, *infra*.

²⁸³ See Section III.B.3, *supra*; *Wireless Broadband Access Task Force Report*, at 23; Clearwire, *Now Serving/Coming Soon* (visited June 3, 2005) <<http://www.clearwire.com>>. In addition to Clearwire, several small wireless broadband providers operating in the BRS/EBS band have begun to roll out non-line-of-sight OFDM equipment, some of which is manufactured by NextNet Wireless, to their customers. See Section III.B.3, *supra*.

²⁸⁴ *Wireless Broadband Access Task Force Report*, at 19-20.

²⁸⁵ Clearwire, *Service Plans* (visited June 3, 2005) <<http://www.clearwire.com>>.

²⁸⁶ “Delivering the Future of Broadband Wireless Today,” Presentation by Guy Kelnhofer, President and CEO, NextNet Wireless, submitted at the Wireless Broadband Forum, May 19, 2004, Federal Communications Commission, Washington, DC.

²⁸⁷ *Wireless Broadband Access Task Force Report*, at 23.

²⁸⁸ *Id.*, at 19-20; Melanie Reynolds, *Getting a Fix on WiMax*, ELECTRONICS WEEKLY, Feb. 23, 2005; Mark Boslet, *Curtain Rises for WiMax Broadband*, DOW JONES NEWSWIRES, Feb. 2, 2005.

²⁸⁹ *Wireless Broadband Access Task Force Report*, at 23.

the Raleigh-Durham, N.C. market in February 2004 and began offering the service on a commercial basis in April 2004.²⁹⁰ The service used Flash-OFDM (orthogonal frequency division multiplexing) technology developed by Flarion Technologies to provide typical download speeds of 950 kbps to 1.5 Mbps, with burst rates of up to 3.0 Mbps.²⁹¹ Customers could purchase either a wireless modem for a personal computer or a wireless modem card to use with a laptop computer. In February 2005, however, shortly after announcing its proposed merger with Sprint, Nextel stated that it would end its Flarion service in Raleigh in June 2005. In January 2005, Sprint joined the WiMAX Forum, and analysts speculate that the new, merged company will use its BRS spectrum to deploy WiMAX instead of or in addition to Flash-OFDM technology.²⁹²

124. Among the narrowband data-only providers, several carriers use paging spectrum to operate networks that offer traditional one-way paging services.²⁹³ Some paging carriers also operate data networks using narrowband PCS spectrum, which allow them to offer two-way messaging services. Narrowband PCS carriers use the ReFLEX technology protocol, which can transmit data at speeds ranging from 3.2 to 25 kbps.²⁹⁴ USA Mobility, the largest U.S. paging company formed from the merger of Metrocall and WebLink Wireless in November 2004, offers both traditional paging services and two-way messaging services. The company's narrowband PCS network uses ReFLEX technology developed by Motorola and covers 90 percent of the U.S. population.²⁹⁵

125. Two other carriers, Cingular Wireless and Motient Corp. ("Motient"), operate two-way data networks using the 900 MHz SMR and 800 MHz SMR spectrum bands, respectively. Cingular Wireless's network, known as the Mobitex, is a packet-switched radio technology that provides always-on, two-way messaging and data delivery and covers 93 percent of the urban business population in the U.S.²⁹⁶ The Motient (formerly ARDIS) network includes more than 2,200 base stations and provides coverage in 400 U.S. cities covering 90 percent of the U.S. business population.²⁹⁷ These networks have provided a variety of mobile data services to personal digital assistants ("PDAs") and other handheld devices, including Blackberry devices made by Research in Motion (RIM). However, over the past year, RIM discontinued the production of the non-voice Blackberry devices that operate on these networks.²⁹⁸

126. As discussed in the *Ninth Report*, Space Data is using narrowband PCS spectrum in the 900 MHz band and balloon-borne platforms, called SkySitesTM, to roll out a commercial telemetry service.²⁹⁹ Although national weather services have been using balloon systems to transmit atmospheric

²⁹⁰ See *Ninth Report*, at 20653; *Wireless Broadband Access Task Force Report*, at 27.

²⁹¹ *Id.*

²⁹² *Wireless Broadband Access Task Force Report*, at 27.

²⁹³ See Section III.A, Services and Product Market Definition, and Section III.B.3, Data-Only Providers, *supra*, for a discussion of traditional paging services and paging carriers.

²⁹⁴ See *Ninth Report*, at 20654.

²⁹⁵ USA Mobility, *About USA Mobility – Quick Corporate Fact Sheet* (visited June 3, 2005) <<http://www.usamobility.com/about/facts.htm>>.

²⁹⁶ See *Ninth Report*, at 20655.

²⁹⁷ See *Ninth Report*, at 20655; eAccess Solutions, Inc., *DataTAC Network Coverage* (visited June 3, 2005) <http://www.eaccess.com/wireless_tech/datatac.htm>.

²⁹⁸ RIM, *Blackberry Wireless Devices* (visited June 3, 2005) <<http://www.rim.net/products/handhelds/index.shtml>>; Motient Corp, SEC Form 10-K, filed Mar. 31, 2005, at 4.

²⁹⁹ See *Ninth Report*, at 20655. See also Section III.B.3, Data-Only Providers, *supra*.

data to ground-based weather stations for decades, Space Data is the first to make commercial use of this platform.³⁰⁰ In April 2004, Space Data launched its network in West Texas to provide wireless telemetry services to oil and gas companies, and has since expanded its network to cover all of Texas, Louisiana, and Oklahoma, as well as portions of New Mexico, Arizona, California, and the Gulf of Mexico.³⁰¹

2. Capital Expenditures

127. Capital expenditures, alternatively called “capital spending” or abbreviated to “capex,” are funds spent during a particular period to acquire or improve long-term assets such as property, plant, or equipment.³⁰² In the mobile telephone industry, capex consists primarily of spending to expand and improve the geographic coverage of networks, increase the capacity of existing networks so they can serve more customers, and improve the capabilities of networks (by allowing higher data transmission speeds, for example).³⁰³ One analyst estimated that the wireless industry spent roughly \$22 billion on capex in 2004, an increase of 12 percent from the \$19 billion spent in 2003, reversing a two-year trend of declining wireless capex.³⁰⁴ One analyst has argued that capex spent to expand coverage is now mostly over and that future capex will be spent largely on technological upgrades and capacity needs.³⁰⁵

3. Roaming

128. All mobile calling plans specify a calling area – such as a particular metropolitan area, a state, a region, the carrier’s entire network, or the entire United States – within which the subscriber can make a call without incurring additional charges. When a subscriber exits this area, or “roams,” he or she may incur additional charges for each minute of use. Sometimes these roaming charges go directly to the subscriber’s carrier, and sometimes the charges are used to pay a carrier other than the subscriber’s, on whose network the subscriber was roaming.³⁰⁶ This source of revenue is particularly important to many rural and smaller carriers.³⁰⁷ However, roaming revenues are under pressure as roaming rates have declined and nationwide carriers continue to expand into smaller communities.³⁰⁸

³⁰⁰ See *Ninth Report*, at 20655.

³⁰¹ *Space Data Corporation Launches New Wireless Telemetry Service in West Texas Oil and Gas Fields*, Press Release, Space Data Corporation, Apr. 14, 2004; *Space Data’s SkySite® Network Takes Off Over South-Central U.S.*, Press Release, Space Data Corporation, Oct. 19, 2004.

³⁰² CNNMoney, *Money 101 Glossary* (visited Mar. 20, 2003) <<http://money.cnn.com/services/glossary/c.html>>. There are differing opinions on what constitutes capital spending versus non-capital spending.

³⁰³ *Eighth Report*, at 14818.

³⁰⁴ *US Wireless Matrix 4Q04*, at 38; *Ninth Report*, at 20656. While this report is retrospective, the Commission plans to examine in next year’s report the possible impact of Hurricane Katrina on CMRS-related capital expenditures.

³⁰⁵ *Ninth Report*, at 20656. See, also, *Wireless 411*, at 68.

³⁰⁶ The fees that a carrier collects from non-subscribers using its network are called “outcollect” fees, and the fees that a carrier pays for its subscribers to roam on other networks are called “incollect” fees. Margo McCall, *Roaming Feeds Regional Carriers*, WIRELESS WEEK, Mar. 26, 2001, at 23.

³⁰⁷ See *Wireless 411*, at 40 (Table 19: Roaming Revenues as a Percentage of Total Service Revenues).

³⁰⁸ Matt Richtel, *Where Only the Antelope Roam*, NEW YORK TIMES, Nov. 6, 2004. According to John Stanton, the chief executive of Western Wireless, the per-minute roaming charge that national carriers pay to regional companies has dropped to 16 cents a minute, on average, from as high as \$1 in the 1990’s. Matt Richtel, *Where Only the Antelope Roam*, NEW YORK TIMES, Nov. 6, 2004. See, also, *Wireless 411*, at 33 (“Regional operators have (continued....)”).

129. CTIA reported that roaming revenues for the mobile telephone industry increased over the past year, from \$3.8 billion in 2003 to \$4.2 billion in 2004, reversing the trend of the last few years.³⁰⁹ However, the contribution of roaming revenues to total service revenues continued its decline, from 4.3 percent reported in 2003 to 4.1 percent in 2004, and down from over 10 percent five years ago.³¹⁰

4. Advertising and Marketing

130. Firms may engage in advertising and marketing either to inform consumers of available products or services or to increase sales by changing consumer preferences. Mobile telecommunications service is an “experience good,”³¹¹ and in general, advertising for an experience good tends to be persuasive rather than informational in nature.

131. As a group, the five nationwide operators spent a total of \$3.9 billion on advertising in 2004, up 9 percent from 2003, and up 24 percent from 2002.³¹² Advertising expenditures - including television, radio, newspaper, magazine, and outdoor spending - were roughly 4.5 percent of wireless service revenues.³¹³ The \$3.9 billion figure places wireless services among the highest-spending industry groups.³¹⁴ The top three network TV advertisers in 2004 were Sprint PCS, Verizon Wireless, and Cingular, ahead of McDonald’s, Wendy’s and Burger King.³¹⁵ Advertising expenditures per subscriber fell in 2004, which one analyst attributes to the growth of the wireless subscriber base.³¹⁶

5. Quality of Service

132. As U.S. mobile penetration moves closer to the saturation point, competitive pressure to attract new customers and retain existing customers has resulted in concerted efforts by carriers to improve service quality.³¹⁷ As in years past, network investment remains a key element of carriers’ strategies for improving service quality. Section IV.B.1 above of this report, as well as similar sections in previous reports, detail the digital and next-generation upgrades that carriers have been making to improve the coverage, capacity, and capabilities of their networks, while Section IV.B.2 provides an estimate of total spending by wireless carriers on network expansion and improvements.³¹⁸ By increasing

(Continued from previous page) —————

generally seen annual declines in roaming revenues, as growth in roaming minutes has been more than offset by declines in roaming rates”).

³⁰⁹ See Appendix A, Table 1, *infra*.

³¹⁰ *Id.*

³¹¹ An experience good is a product or service that the customer must consume before determining its quality. See Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization* (3rd ed., Addison, Wellsley, Longman, Inc., 1999), at 484.

³¹² Simon Flannery, *et al.*, *Wireless Carrier Advertising Remains Intense*, Morgan Stanley, Equity Research, May 18, 2005, at 2.

³¹³ *Id.*, at 3.

³¹⁴ *Id.*, at 2.

³¹⁵ *Id.*, at 2.

³¹⁶ *Id.*, at 4 (“Of course, advertising also serves to retain existing subscribers, not just to bring in new gross adds. Since it is generally harder to bring in a new sub than to keep an old one, we would expect ad expense per subscriber to trend down as subscriber bases grow, as has been the case.”)

³¹⁷ The Associated Press, *Sprint Looks to Fix Customer Problems*, NEW YORK TIMES, Mar. 10, 2005 (“*Sprint Looks to Fix Customer Problems*”).

³¹⁸ See *Ninth Report*, at 20657.

network coverage and call handling capacity and improving network performance and capabilities, carriers' investments in network deployment and upgrades have the potential to result in service quality improvements that are perceptible to consumers, such as better voice quality, higher call-completion rates, fewer dropped calls and deadzones, additional calling features, more rapid data transmission, and advanced data applications. As noted in the *Ninth Report*, one of the principal ways carriers have improved network coverage and quality is by increasing the number of cell sites.³¹⁹ In addition, carriers have been deploying micro-cell sites, or antennas that provide coverage in highly localized areas, to improve coverage in locations such as tunnels, airports, and certain neighborhoods.³²⁰ Some carriers have also used devices that amplify cellular signals, called repeaters, to improve indoor coverage in office buildings, shopping malls, and convention centers.³²¹

133. Carriers can increase capacity and thereby improve service quality not only by investing in their networks, but also by acquiring additional spectrum. As detailed in Sections III.D and III.E.1 above, carriers have added to their spectrum holdings through the Commission's spectrum auctions, the purchase of licenses in the secondary market, and mergers and acquisitions. Cingular's acquisition of AT&T Wireless is a key example of this strategy. The two carriers argued that by combining their spectrum holdings and network infrastructure, the merged company would achieve an increase in capacity that would enable it to offer service with better voice and data quality, fewer dropped calls, and lower blocking rates, especially during peak call hours.³²² However, while Cingular continues to maintain that the merger will ultimately improve coverage, it has emphasized that the promised benefits will not be fully realized until the integration of the two carriers' networks is completed in June 2006.³²³

134. In addition to investing in network infrastructure and spectrum, carriers continue to pursue marketing strategies designed to differentiate their service from rival offerings with regard to consumer perceptions of service quality. Previous reports cited Verizon Wireless's "Can You Hear Me Now?" advertising campaign as an example of an attempt at such brand differentiation based on superior network coverage, reliability and voice quality.³²⁴ Analysts continue to single out Verizon Wireless as being mainly differentiated from its rivals by its network quality.³²⁵ A recent survey of wireless subscribers found that 40 percent of Verizon Wireless customers indicated that network quality was their main reason for choosing Verizon.³²⁶ As indicated in the *Eighth Report*, brand differentiation works in tandem with quality-enhancing network investment to create a competitive advantage in attracting and retaining subscribers.³²⁷

³¹⁹ *Id.*, at 20657-20658.

³²⁰ Li Yuan, *Why You Still Can't Hear Me Now*, WALL STREET JOURNAL, May 25, 2005, at D1 ("*Why You Still Can't Hear Me Now*").

³²¹ *Id.*

³²² *Cingular-AT&T Wireless Order*, at 21601.

³²³ *Why You Still Can't Hear Me Now*; Li Yuan and Jesse Drucker, *How Cellular Services Rank On Complaints*, WALL STREET JOURNAL, Mar. 29, 2005, p. D1.

³²⁴ *See Eighth Report*, at 14825.

³²⁵ Simon Flannery *et al.*, *1Q05 Trend Tracker: The Telecom Conundrum*, Morgan Stanley, Equity Research, June 8, 2005, at 24 ("*1Q05 Trend Tracker*"); *Ninth Report*, at 20658.

³²⁶ Phil Cusick and Richard Choe, *Characteristics of Wireless Subscribers and Non-Users*, Bear Stearns, Equity Research, Feb. 2005, at 25.

³²⁷ *See Eighth Report*, at 14824-14825.

135. T-Mobile introduced a new strategy for differentiating its service with regard to network quality in the past year. T-Mobile is the first national carrier to add an interactive “Personal Coverage Check” feature to its Web site that enables customers to check the quality of network coverage where they live and work before they purchase service.³²⁸ T-Mobile’s computerized mapping tool allows users to search on any street address or intersection in the United States and get a rating of the signal strength at that location and in the surrounding area. For each search, T-Mobile provides a color-coded map with eleven shades of coverage ranging from “none” to “great.” According to T-Mobile, the top rating means that calls are rarely dropped.³²⁹ T-Mobile has also made its new interactive maps available on computers in its stores, with signs urging customers to “put our coverage to the test before you sign up.”³³⁰ In contrast, although all carriers provide national or regional coverage maps to customers that show the cities where they provide some level of service, these coverage maps generally provide only a broad overview of a carrier’s coverage.³³¹ Most carriers do not provide details about the quality of service in specific neighborhoods except when customers request such information from sales representatives.³³²

136. According to analysts, by providing potential customers with more accurate information and assurances about service quality, the new tool may help T-Mobile differentiate its service from those of its rivals.³³³ In addition, it may enable T-Mobile to reduce churn and customer complaints by discouraging customers who live or work in areas with poor reception from signing up. T-Mobile’s innovation may also put competitive pressure on other carriers to provide additional information about possible geographic variations in the quality of their network coverage. For example, Cingular offers an interactive mapping tool in its stores that enables customers to estimate the likelihood of coverage inside a building or a vehicle at a specific location, and the company has indicated that it intends to add the service to its Web site later in 2005.³³⁴

137. Carriers are also actively competing to attract and retain customers based on other dimensions of customer service. An example is cellphone repair and replacement. Sprint is rolling out an in-store repair service for customers who need to get their cellphones fixed.³³⁵ Sprint planned to have repair shops in more than half of its 800 retail locations across the country by the middle of March 2005.³³⁶ Some rival carriers, including Cingular Wireless and T-Mobile, have decided not to provide repair services in their stores, but instead let customers with malfunctioning cellphones call a toll-free number and have a replacement phone sent to them overnight.³³⁷

138. Consumer satisfaction surveys afford one means of gauging the effects of carrier

³²⁸ David Kesmodel, *T-Mobile Offers More Details On Coverage to Ease Concerns*, WALL STREET JOURNAL, Apr. 27, 2005 (“*T-Mobile Offers More Details On Coverage*”).

³²⁹ *Id.* More specifically, the top rating means that customers have a 95 percent chance of making a call without it being dropped. *Id.*

³³⁰ *Id.*

³³¹ *Id.* See, also, Jeff Gelles, *Consumers Get Less Static on Cellular Coverage*, PHILADELPHIA INQUIRER, May 2, 2005 (“*Consumers Get Less Static on Cellular Coverage*”).

³³² *T-Mobile Offers More Details On Coverage.*

³³³ *Id.*

³³⁴ *Id.*

³³⁵ *Sprint Looks to Fix Customer Problems.*

³³⁶ *Id.*

³³⁷ *Id.*

strategies for improving service quality on customer perceptions of service quality. Survey results and related evidence of customer satisfaction with cellphone service quality are summarized below in the section on mobile telecommunications market performance.³³⁸

6. Mobile Data Services and Applications

139. As documented in the *Ninth Report* and previous reports, the major mobile telephone carriers and other mobile data providers have progressively introduced a wide variety of mobile data services and applications.³³⁹ Currently, the largest segment of the mobile data market consists of handset-based applications marketed to consumers primarily as an add-on to mobile voice service, including text messaging (“SMS”), multimedia messaging services (“MMS”) such as photo messaging, and entertainment applications such as ringtones and games. A second market segment consists of monthly mobile Internet access service packages for customers who wish to connect to wireless networks primarily or exclusively for data, rather than voice use, and who typically access the Internet through laptops or Personal Digital Assistants (“PDAs”).

140. In the past year carriers have continued to expand and enhance their mobile data offerings. An example is the continued rollout of television services on cellphones. As discussed in the *Ninth Report*, Sprint PCS was the first U.S. mobile carrier to offer a live video programming service for mobile phones called MobiTV.³⁴⁰ The service is powered onto cellphones by a privately-held California company called Idetic Inc., which streams the programs onto the phones via the Internet from servers that first convert the TV signals into digital files.³⁴¹ The service enables mobile subscribers to watch real-time news, sports, and entertainment programming and other video content from a variety of cable television channels. As with earlier applications, the introduction of a new data service by one carrier has prompted other carriers to begin offering competing services. For example, MobiTV was launched on AT&T Wireless’s mMode data service in late 2004, prior to the company’s acquisition by Cingular, and in early 2005 Cingular also began offering MobiTV through its Media Net service.³⁴² Like Sprint, Cingular offers the service for a fixed monthly fee as an add-on to voice service. Sprint has also improved its wireless TV service by adding new channels to its roster of live television programming and by offering a second type of service, called Sprint TV, which provides specially produced short clips from major networks.³⁴³

141. Verizon Wireless has extended the range of services provided over its EV-DO network to include video on demand and other multimedia services. When it began commercial operation in late 2003, the EV-DO network was used to provide Verizon’s BroadbandAccess wireless Internet access service for business customers and other heavy data users, and could be accessed only via a special modem card inserted into a laptop computer.³⁴⁴ In early 2005, Verizon Wireless introduced 3G handsets that can access the EV-DO network and launched VCAST, the country’s first wireless multimedia service

³³⁸ See Section VI.C, Quality of Service, *infra*.

³³⁹ See *Eighth Report*, at 14843-14856; *Ninth Report*, at 20659-20661.

³⁴⁰ *Ninth Report*, at 20660.

³⁴¹ Walter S. Mossberg, *Watching TV on Your Cellphone*, WALL STREET JOURNAL, Sept. 1, 2004, p. D7 (“*Watching TV on Your Cellphone*”).

³⁴² *Cingular Goes Live With MobiTV*, News Release, Cingular, Jan. 25, 2005.

³⁴³ *Sprint Offers Fox News Channel*, WALL STREET JOURNAL, Apr. 19, 2005; *Watching TV on Your Cellphone*.

³⁴⁴ Walter S. Mossberg, *Verizon Devices Use High-Speed Network for Voice, Web, E-Mail*, WALL STREET JOURNAL, Dec. 16, 2004, p. B1 (“*Verizon Devices Use High-Speed Network*”).

to be provided over a next-generation network using EV-DO technology.³⁴⁵ VCAST customers can use the new 3G handsets to access the EV-DO network for a wide range of content, including news programming and short, made-for-mobile episodes of TV programs. For a fixed monthly fee on top of what they pay for their regular Verizon calling plan, VCAST customers get unlimited access to Verizon's basic video news clips service and unlimited browsing of Verizon's "Mobile Web" news and information service. Premium content is available for an additional cost, including 3-D games, music videos, and other premium channels.

142. Verizon Wireless is hoping to leverage the high-speed capability of EV-DO technology in an effort to differentiate its wireless Internet access service and multimedia service from rival offerings. With speeds that are three to five times as fast as the typical speeds available over cellphone networks using older technologies, Verizon's EV-DO network enables laptop users to download files, play streaming video and audio, and receive e-mails at speeds that are comparable to what many users get from fixed broadband connections such as DSL.³⁴⁶ Similarly, compared to rival offerings based on slower network technologies, the EV-DO capabilities of Verizon's new 3G phones make viewing streaming video and downloading various other applications on cellphones feel more like a broadband experience on a personal computer.³⁴⁷ As noted in the *Ninth Report*, the slow speeds offered by earlier wireless network technologies adversely affect the viewing quality of video streamed onto cellphones by reducing the rate at which frames are shown.³⁴⁸

143. Although Verizon has taken the lead with regard to the deployment of a broadband wireless data network, Sprint PCS continues to be the market leader in pre-broadband consumer wireless data as measured by the contribution of data to overall ARPU.³⁴⁹ In the first quarter of 2005, data accounted for 9.8 percent of Sprint's ARPU, followed by T-Mobile (7.6 percent), Cingular (7.5 percent), Verizon Wireless (6.3 percent), and Nextel (4.5 percent).³⁵⁰ One reason the contribution of data to Sprint's overall ARPU is comparatively high appears to be that a relatively large share of Sprint's total customer base use data services. Sprint reported nearly 7.7 million direct wireless data subscribers, or about 43 percent of its total direct customers, at the end of the fourth quarter of 2004, including 6.2 million Vision subscribers.³⁵¹ In comparison, both Cingular and Verizon Wireless have reported that more than a third of their customers are data users.³⁵²

³⁴⁵ *Id.*; *On-Demand in the Palm of Your Hand: Verizon Wireless Launches "VCAST" – Nation's First and Only Consumer 3G Multimedia Service*, News Release, Verizon Wireless, Jan. 7, 2005; *Now Playing on a Cell Phone Near You: Video Clips, Music Videos and 3D Games*, News Release, Verizon Wireless, Jan. 31, 2005.

³⁴⁶ Walter S. Mossberg, *Verizon is Crossing the U.S. With Speedy, True Wireless Access*, WALL STREET JOURNAL, Apr. 8, 2004, p. B1.

³⁴⁷ *Verizon Devices Use High-Speed Network*.

³⁴⁸ *Ninth Report*, at 20660; *see also*, *Watching TV on Your Cellphone; Verizon Devices Use High-Speed Network*; and Christopher Rhoads, *Cellphones Become 'Swiss Army Knives' as Technology Blurs*, WALL STREET JOURNAL, Jan. 4, 2005, p. B1.

³⁴⁹ *Ninth Report*, at 20660.

³⁵⁰ *1Q05 Trend Tracker*, at 25. *See also*, Daniel Henriques *et al.*, *The Quarter in Pictures – 1Q05 U.S. Telecom Services Review*, Goldman Sachs, Global Investment Research, at 24 (showing that Sprint remains the data market leader as measured by the contribution of data to service revenue, followed by Cingular, Verizon, and Nextel).

³⁵¹ *Sprint Reports Fourth Quarter and Full-Year 2004 Results*, News Release, Sprint, Feb. 3, 2005, at 1 and 4.

³⁵² *Verizon Reports Strong 4Q and 2004 Results, Driven by Wireless Revenue Growth, Solid Cash Flows and Margins*, News Release, Verizon Communications Inc., Jan. 27, 2005, at 7; *First Quarter 2005 Financial and Operational Results*, Presentation, Cingular Wireless, Apr. 20, 2005, at 13.

144. Another important development is the move to extend inter-carrier operability to multimedia messaging services such as photo and video messaging. As noted in the *Ninth Report*, the introduction and progressive implementation of inter-carrier operability of SMS has been credited with stimulating the growth of text messaging in the U.S. mobile market.³⁵³ As with SMS prior to the introduction of inter-carrier operability, initially U.S. mobile subscribers were capable of exchanging photo and video messages only with subscribers on the same carrier's network. In October 2004, CTIA announced that wireless carriers have reached an agreement to provide consumers with MMS interoperability so that subscribers on different networks can exchange such multimedia messages.³⁵⁴ To this end, an industry working group, called the Inter-Carrier MMS Working Group, established a set of guidelines designed to allow wireless carriers to phase-in interoperability of photo and video messaging services over time. The working group began meeting in May 2004 with the goal of identifying a common set of features that could be supported by all participating carriers. Verizon Wireless has already signed interoperability agreements with select wireless carriers, including Cingular Wireless, U.S. Cellular, and Leap Wireless, thereby allowing customers with cameraphones to send photos, video clips, and audio files to subscribers on another carrier's network.³⁵⁵ Verizon Wireless believes that such inter-carrier agreements will encourage the growth of picture messaging in the same way that inter-carrier text messaging spurred the growth of SMS.

V. CONSUMER BEHAVIOR IN THE MOBILE TELECOMMUNICATIONS MARKET

145. A mobile carrier can exercise market power only to the extent that mobile subscribers do not respond to price increases or other adverse competitive effects. If, to the contrary, enough consumers are sufficiently well-informed to take prices and other non-price factors into account when choosing their service provider, and likewise, if enough consumers have the ability and propensity to switch service providers in response to an increase in price or other harmful conduct, then the carrier will have an incentive to compete on price and non-price factors. Consumer behavior will be more effective in constraining market power when the transaction costs subscribers incur in choosing and switching carriers are low. Transaction costs depend on, among other factors, subscribers' access to and ability to use information, and costs and barriers to switching carriers.

A. Access to Information on Mobile Telecommunications Services

146. Wireless consumers continue to demand more information on the availability and quality of mobile telecommunications services, and numerous third parties have been responding to this demand by compiling and reporting such information. The *Eighth Report* enumerated the considerable sources of information available to consumers, including publications such as *Consumer Reports*, trade associations, marketing and consulting firms, and several web sites dedicated to giving consumers an overview and comparison of the mobile telephone services available in their area.³⁵⁶ These sources continue to update consumers on the wireless service options available to them. For example, the February 2005 issue of *Consumer Reports* magazine published the results of a new customer satisfaction survey on mobile telephone service.³⁵⁷

147. In addition, the wireless industry itself has responded to this demand by launching various initiatives designed to educate consumers and help them make informed choices when purchasing

³⁵³ *Ninth Report*, at 20661.

³⁵⁴ *Largent Announces Landmark MMS Interoperability Pact*, News Release, CTIA, Oct. 26, 2004.

³⁵⁵ Susan Rush, *Verizon Signs Another MMS Interop Partner*, WIRELESS WEEK, May 23, 2005.

³⁵⁶ See *Eighth Report*, at 14826.

³⁵⁷ *Cellular Service*, CONSUMER REPORTS, Feb. 2005, at 18.

wireless services. One early example of such an initiative, the voluntary “10-Point Consumer Code” sponsored by CTIA, was discussed in the *Ninth Report*.³⁵⁸ As noted above in Section IV.B.5, a more recent example is the interactive “Personal Coverage Check” feature which T-Mobile added to its Web site to enable customers to check the quality of network coverage where they live and work before they purchase service.

B. Consumer Ability to Switch Service Providers

1. Churn

148. Churn refers to the number of customers an operator loses over a given period of time. Mobile telephone operators usually express churn in terms of an average percent churn per month. For example, an operator might report an average monthly churn of 2 percent in a given fiscal quarter. In other words, on average, the operator lost 2 percent of its customers in each of the quarter’s three months.

149. Most carriers report churn rates between 1.5 percent and 3.0 percent per month,³⁵⁹ showing a slight decline over the past year.³⁶⁰ However, this level still creates significant challenges for the industry. One analyst wrote, “Monthly churn rates are so high that gross adds have been running about three times higher than net adds. In other words, for every three new customers the national carriers bring in, they are losing two, on average.”³⁶¹ Another analyst described churn as “the problem of this industry, wiping out 20% of the industry revenue.”³⁶² Consistent with findings in previous reports,³⁶³ customers cite service pricing and network quality as the main reasons for changing providers.³⁶⁴

2. Local Number Portability

150. Local number portability (LNP) refers to the ability of users of telecommunications services to retain, at the same location, existing telecommunications numbers when switching from one telecommunications carrier to another.³⁶⁵ Thus, subscribers can port numbers between two CMRS carriers (intramodal porting) or between a CMRS and wireline carrier (intermodal porting). Under the Commission’s rules and orders, covered CMRS carriers operating in the 100 largest Metropolitan

³⁵⁸ *Ninth Report*, at 20662.

³⁵⁹ *US Wireless Matrix 4Q04*, at 14.

³⁶⁰ *Id.*, at 4. See also, *1Q05 Trend Tracker*, at 24 (“Churn continues to slowly trend downward”). One analyst attributes this decline to “(1) greater industry maturity - many customers have already switched several times and are settling with the carrier most suitable for their needs; (2) industry structure rationalization and larger size - carriers seem reluctant to engage in a price war that would result in repricing a very large base of incumbent subscribers; and (3) less perceived differentiation terms of service and network quality.” Jason Armstrong *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, Apr. 22, 2005, at 2.

³⁶¹ Simon Flannery and Vance Edelson, *Wireless Carriers Susceptible to Slowing Industry Growth*, Morgan Stanley, Equity Research, May 25, 2005, at 1.

³⁶² Timothy Horan *et al.*, *Raising Wireless Subscriber; Profitability Outlook Improving*, CIBC World Markets, Equity Research, May 12, 2005, at 4.

³⁶³ See *Sixth Report*, at 13372-73; *Seventh Report*, at 13007; *Eighth Report*, at 14817; *Ninth Report*, at 20663.

³⁶⁴ See, e.g., COMMUNICATIONS DAILY, Nov. 8, 2004, at 7 (citing a Harris Interactive report); Simon Flannery and Vance Edelson, *Strong Showing for Bells in Annual Corporate Survey*, Morgan Stanley, Equity Research, Jun. 22, 2004, at slide 10; Phil Cusick and Richard Choe, *Characteristics of Wireless Subscribers and Non-Users*, Bear Stearns, Equity Research, Feb. 2005, at 26-28.

³⁶⁵ 47 C.F.R. § 52.21(l).

Statistical Areas (MSAs) were required to begin providing number portability by November 24, 2003.³⁶⁶ CMRS carriers outside of the top 100 MSAs were required to be LNP-capable by May 24, 2004.³⁶⁷

151. Wireless number porting activity since the advent of porting has been significant. Overall, approximately 11.3 million wireless subscribers ported their numbers to another wireless carrier from December 2003 through April 2005.³⁶⁸ Monthly rates of intramodal porting activity remained fairly steady during this period, with 713,000 ports in January 2004 and 735,000 in April 2005.³⁶⁹ Monthly levels of intermodal porting from wireline carriers to CMRS carriers significantly increased over 2004, from an average rate of 76,000 ports per month in the first six months of 2004 to an average rate of approximately 99,000 in the second half of the year, suggesting an increase in the extent of intermodal competition.³⁷⁰ Intermodal porting from wireless to wireline carriers, however, remained steady at 1000-2000 ports per month.³⁷¹

152. We noted in the *Ninth Report* that the advent of porting in late 2003 did not lead to a significant increase in wireless churn, but did appear to have had an impact on service quality by inducing carriers to engage in aggressive customer retention efforts.³⁷² In light of the steady rates of intra-modal porting from December of 2003 to October of 2004, and the slight decline in churn during 2004, we again conclude that porting has not caused churn to significantly increase, but is likely contributing to additional quality measures being taken by carriers to retain customers.³⁷³

VI. MOBILE TELECOMMUNICATIONS MARKET PERFORMANCE

153. The structural and behavioral characteristics of a competitive market are desirable not as ends in themselves, but rather as a means of bringing tangible benefits to consumers such as lower prices, higher quality and greater choice of services. Such consumer outcomes are the ultimate test of effective competition. To determine if these goals are met and whether there is still effective competition in the market, in this section we analyze various metrics including pricing levels and trends, subscriber growth and penetration, minutes of use (“MOU”), innovation and diffusion of services, and quality of service.

A. Pricing Levels and Trends

1. Pricing Trends.

154. Equity analysts and other industry observers continue to describe wireless price competition in the United States as intense, so much so that one analyst said, “even a carrier with large

³⁶⁶ 47 C.F.R. § 52.31(a); Verizon Wireless's Petition for Partial Forbearance From Commercial Mobile Radio Services Number Portability Obligation and Telephone Number Portability, WT Docket No. 01-184, Telephone Number Portability, CC Docket No. 95-116, *Memorandum Opinion and Order*, 17 FCC Rcd 14972, 14986, para. 31 (2002) (“*Verizon Wireless LNP Order*”).

³⁶⁷ *Verizon Wireless LNP Order*, 17 FCC Rcd at 14986, para. 31.

³⁶⁸ Craig Stroup and John Vu, *Numbering Resource Utilization in the United States as of December 31, 2004*, Federal Communications Commission, Aug. 2005, at 35.

³⁶⁹ *Id.*

³⁷⁰ *Id.*

³⁷¹ *Id.*

³⁷² *Ninth Report*, at 20664.

³⁷³ See *US Wireless Matrix 4Q04*, at 1, 14; Phil Cusick and Richard Choe, *Characteristics of Wireless Subscribers and Non-Users*, Bear Stearns, Equity Research, Feb. 2005, at 5-6 (noting that Verizon, Nextel and U.S. Cellular “have focused on customer service and satisfaction as an effective mechanism to mitigate churn.”); CTIA Comments, at 20.

market share in an area has very little pricing power.”³⁷⁴ However, wide variations in the non-price terms and features of wireless service plans make it difficult to characterize the price of mobile telephone service, and consequently it is difficult to identify sources of information that track mobile telephone prices in a comprehensive manner.³⁷⁵ As documented in previous reports, there is ample evidence of a sharp decline in mobile telephone prices in the period since the launch of PCS service. One analyst estimated that the average per-minute cost of wireless calling plunged over 65 percent in the past four years alone.³⁷⁶

155. Two indicators of mobile telephone pricing show that the long-term decline in the cost of mobile telephone services continued through 2004.³⁷⁷ One study of mobile telephone pricing shows a slight increase in the cost of mobile telephone services in 2004.

156. According to one economic research and consulting firm, Econ One, mobile telephone prices in the 25 largest U.S. cities increased 1.8 percent in 2004.³⁷⁸ The average cost of monthly service³⁷⁹ – which was calculated across four typical usage plans (200, 500, 800 and 1100 minutes) – increased from \$43.37 in January 2004 to \$44.13 in January 2005.³⁸⁰

157. Another source of price information is the cellular telephone services component of the Consumer Price Index (“Cellular CPI”) produced by the United States Department of Labor’s Bureau of Labor Statistics (“BLS”).³⁸¹ Cellular CPI data is published on a national basis only.³⁸² From 2003 to

³⁷⁴ Phil Cusick and Richard Choe, *Wireless 101: A U.S. Wireless Industry Primer*, Bear Stearns, Equity Research, June 2005, at 10.

³⁷⁵ See *Fourth Report*, at 10164-10165.

³⁷⁶ David Pringle, *Slower Growth Hits Cellphone Services Overseas*, WALL STREET JOURNAL, May 23, 2005 (citing a Yankee Group survey).

³⁷⁷ Fees for actual service are only one element of cost that consumers face. One analyst estimated that the average price a consumer paid for a wireless handset had fallen from \$128 in 1999 to \$88 in 2003, a decline of 31 percent. *Likelihood Of Purchasing New Cell Phone Is On The Rise*, News Release, J.D. Powers and Associates, Oct. 23, 2003.

³⁷⁸ *Econ One Wireless Survey: Costs Nudge Down in December*, News Release, Econ One, Jan. 12, 2004. The survey is based on an analysis of pricing plan data collected from carriers’ websites. *Transcript*, at 78.

³⁷⁹ This does not include any additional charges for roaming or long-distance service.

³⁸⁰ *Econ One Wireless Survey: Service Costs Stay Flat*, News Release, Econ One, Feb. 17, 2004; *Econ One Wireless Survey: Wireless Costs Decline*, News Release, Econ One, Feb. 22, 2005. The analysis assumes a 70 percent peak/30 percent off-peak split in the kind of minutes used. In January 2004, Econ One modified the minute buckets in its analysis to “reflect increased consumer service usage.” Instead of reporting cost of wireless service based on 50, 200, 500, and 800 MOUs per month, Econ One increased the buckets to 200, 500, 800 and 1100 MOUs per month. In addition, Econ One added service plans offered by Nextel Communications into its analysis. Thus, Econ One’s analysis is not directly comparable to prior periods. *Econ One Wireless Survey: Service Costs Stay Flat*, News Release, Econ One, Feb. 17, 2004.

³⁸¹ See Appendix A, Table 7, *infra*. The Consumer Price Index (“CPI”) is a measure of the average change over time in the prices paid by urban consumers for a fixed market basket of consumer goods and services. The basket of goods includes over 200 categories including items such as food and beverages, housing, apparel, transportation, medical care, recreation, education, and communications. The CPI provides a way for consumers to compare what the market basket of goods and services costs this month with what the same market basket cost a month or a year ago. Starting in December of 1997, this basket of goods included a category for cellular telephone services. All CPI figures discussed in this paragraph were taken from BLS databases found on the BLS Internet site at <<http://www.bls.gov>>. The index used in this analysis, the CPI for All Urban Consumers (CPI-U), represents about 87 percent of the total U.S. population. Bureau of Labor Statistics, *Consumer Price Index: Frequently Asked* (continued....)

2004, the annual Cellular CPI decreased by about 1.0 percent while the overall CPI increased by 2.7 percent. The Cellular CPI has declined 34 percent since December 1997, when BLS began tracking it.³⁸³

158. As a third pricing indicator, some analysts believe average revenue per minute (“RPM”) is a good proxy for mobile pricing.³⁸⁴ This is calculated by dividing a carrier’s estimate of ARPU by its estimate of MOUs, yielding the revenue per minute that the carrier is receiving.³⁸⁵ Using its estimates of industry-wide ARPU and MOUs, CTIA’s survey indicates that RPM fell 12 percent between December 2003 and December 2004. In the ten years since 1994, RPM has fallen from \$0.47 in December 1994 to \$0.09 in December 2004, a decline of 82 percent.³⁸⁶

2. Average Revenue Per Unit

159. One financial metric widely used in analyzing the mobile telephone sector is average monthly revenue per subscriber (often referred to as average revenue per unit, or “ARPU”). CTIA’s estimate of ARPU decreased almost continuously between December 1988 and December 1998, when it reached a low of \$39.43.³⁸⁷ However, since 1999, ARPU has been increasing, rising to \$50.64 in December 2004, a 28 percent increase from the low of six years ago, but only a 1.5 percent rise from \$49.49 in December 2003. This trend has continued even though per-minute prices declined throughout this period.³⁸⁸ The recent ARPU increases may be due to a variety of factors, including the demand-stimulating effect of falling per-minute prices. In particular, if demand for mobile telephone service is elastic, increased usage will be sufficient to offset per-minute price declines, causing ARPU to rise in response to a drop in price.³⁸⁹ Another possible factor is the adoption by wireless consumers of higher-priced calling plans.³⁹⁰ Rising ARPU may also be due to increased use of data services by wireless

(Continued from previous page) —————

Questions (visited July 11, 2005) <<http://www.bls.gov/cpi/cpifaq.htm>>. While the CPI-U is urban-oriented, it does include expenditure patterns of some of the rural population. *Transcript*, at 59. Information submitted by companies for the CPI is provided on a voluntary basis. *Transcript*, at 53.

³⁸² *Transcript*, at 50. The Cellular CPI includes charges from all telephone companies that supply “cellular telephone services,” which are defined as “domestic personal consumer phone services where the telephone instrument is portable and it sends/receives signals for calls by wireless transmission.” This measure does not include business calls, telephone equipment rentals, portable radios, and pagers. Bureau of Labor Statistics, *How BLS Measures Price Change for Cellular Telephone Service in the Consumer Price Index* (visited July 11, 2005) <<http://www.bls.gov/cpi/cpifactc.htm>>.

³⁸³ From December 1997 compared to the annual index.

³⁸⁴ See *US Wireless Matrix 4Q04*, at 44.

³⁸⁵ Note that this version of ARPU is CTIA’s “average monthly local bill” and does not include toll or roaming revenues where they are not priced into a calling plan. See note 387, *infra*.

³⁸⁶ See Appendix A, Table 9, *infra*.

³⁸⁷ See Appendix A, Table 1, *infra*. There are different ways of calculating ARPU. The measure used here, CTIA’s “average local monthly bill,” does not include toll or roaming revenues (CTIA calls it “the equivalent of ‘local ARPU’”). *Dec 2004 CTIA Survey*, at 197. CTIA defines an alternative measure of ARPU, which includes roaming revenues but not toll revenue. For a comparison between these two measures, see *Dec 2004 CTIA Survey*, at 100, 198.

³⁸⁸ See Section VI.A.1, Pricing Trends., *supra*.

³⁸⁹ See, e.g., Simon Flannery *et al.*, *Skating on Thin Ice: Lowering Industry View to Cautious*, Morgan Stanley, Equity Research, Jan. 19, 2005, at 16 (showing elasticity of demand greater than one for the last four years).

³⁹⁰ Regardless of whether customers use the large bundles of minutes included with such plans, the higher monthly access fees increase operators’ ARPU figures.

subscribers.³⁹¹ As stated above, in the first quarter of 2005, data accounted for 9.8 percent of Sprint's ARPU, followed by T-Mobile (7.6 percent), Cingular (7.5 percent), Verizon Wireless (6.3 percent), and Nextel (4.5 percent).³⁹²

B. Quantity of Services Purchased

1. Subscriber Growth

a. Mobile Telephony

160. Since the *Seventh Report*, in an effort to improve the accuracy of its estimate of U.S. mobile telephone subscribership, the Commission began analyzing information filed directly with the FCC. This information, the NRUF data,³⁹³ tracks phone number usage information for the United States.³⁹⁴ All mobile wireless carriers must report to the FCC which of their phone numbers have been assigned to end-users, thereby permitting the Commission to make more accurate estimates of subscribership.³⁹⁵ In previous years, for purposes of this report, the Commission had relied on national subscribership data from a highly-respected survey conducted by CTIA.³⁹⁶ While the Commission, for

³⁹¹ See, e.g., Jason Armstrong, *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, Apr. 22, 2005, at 2 (“ARPU strength [is] supported by rational pricing and increasing contribution from data”).

³⁹² *1Q05 Trend Tracker*, at 25.

³⁹³ Carriers began reporting NRUF data biannually beginning with the period ending June 2000. In addition, the Commission's local competition and broadband data gathering program, adopted in March 2000, provides more data on mobile subscribership. The FCC requires mobile wireless carriers with over 10,000 facility-based subscribers in a state to report the number of their subscribers in those states twice a year to the Commission. In their December 31, 2003 filings, operators reported that they served 157 million subscribers. See Appendix A, Table 2, *infra*. However, the Commission recognizes that its reporting rules result in some level of undercount of total industry subscribers since it does not count subscribers served by mobile telephone providers in states where the provider has fewer than 10,000 customers. See Local Competition and Broadband Reporting, *Report and Order*, 15 FCC Rcd 7717, 7743 (2000).

³⁹⁴ When the North American Numbering Plan (“NANP”) was established in 1947, only 86 area codes were assigned to carriers in the United States. Only 61 new codes were added during the next 50 years. But the rate of activation has increased dramatically since then. Between January 1, 1997 and December 31, 2000, 84 new codes were activated in the United States. Because the remaining supply of unassigned area codes is dwindling, and because a premature exhaustion of area codes imposes significant costs on consumers, the Commission has taken a number of steps to ensure that the limited numbering resources are used efficiently. Among other things, the Commission requires carriers to submit data on numbering resource utilization and forecasts twice a year. Federal Communications Commission, *Numbering Resource Utilization in the United States as of June 30, 2001* (Nov. 2001), at 1, 2. This information is submitted to the FCC on Form 502. *Id.*

³⁹⁵ Federal Communications Commission, *Numbering Resource Utilization in the United States as of June 30, 2001* (Nov. 2001), at 1, 2. An assigned number is one that is in use by an end-user customer. *Id.*, at 3. Carriers also report other phone number categories, including: intermediate – numbers given to other companies; aging – numbers held out of circulation; administrative – numbers for internal uses; reserved – numbers reserved for later activation; and available – numbers available to be assigned. *Id.* Assigned numbers are not necessarily from facilities-based carriers. A reseller can assign a number to an end user. This does not double-count in the assigned total, since the facilities-based carrier only counts that number as an “intermediate” number given to the reseller. *Id.*

³⁹⁶ See *Dec 2004 CTIA Survey*. The CTIA effort is a voluntary survey of both its member and non-member facilities-based providers of wireless service. CTIA asks majority owners of corporations to report information for the entire corporation, which helps eliminate double counting. To encourage honest reporting, the surveys are tabulated by an independent accounting firm under terms of confidentiality and are later destroyed. CTIA receives only the aggregate, national totals. Not all wireless carriers submit surveys, however. In order to develop an estimate of total U.S. wireless subscribership, CTIA identifies the markets which are not represented in the survey (continued....)

purposes of this report, now uses NRUF data as the basis for its estimate of mobile telephone subscribership, we continue to report the CTIA data as well for the purpose of comparison.³⁹⁷

161. As of December 2004, we estimate that there were 184.7 million mobile telephone subscribers,³⁹⁸ up from 160.6 million at the end of 2003, which translates into a nationwide penetration rate of 62 percent.³⁹⁹ This addition of 24.1 million subscribers was a 28 percent increase from the 18.8 million added in 2003, and an 80 percent increase over the 13.3 million added in 2002.⁴⁰⁰ In the last three years alone, the total mobile telephone subscriber base has increased 30 percent.

162. CTIA's estimate for year-end 2004 was 182.1 million subscribers, a 15 percent increase over its estimate of 158.7 million subscribers as of year-end 2003.⁴⁰¹ These additions show similar surging subscriber growth, and the 2004 survey's increase of 23.4 million subscribers ties its previous high in 2000.⁴⁰²

163. According to a number of analysts, the main drivers of this high subscriber growth are the attractiveness of innovative service models such as prepaid and family plans - which target previously underserved markets such as youth, immigrants, and the credit-challenged - as well as wireless substitution.⁴⁰³

(Continued from previous page) —————

responses. Then, CTIA uses third-party estimates or extrapolates from surrogate and/or historical data to create an estimate of subscribership for those markets. See *Eighth Report*, at 14813, note 211.

³⁹⁷ The advantages of NRUF data over CTIA's survey are discussed in the *Seventh Report*, at 13004.

³⁹⁸ Craig Stroup and John Vu, *Numbering Resource Utilization in the United States as of December 31, 2004*, Federal Communications Commission, Aug. 2005, at 12 (Table 1: Number Utilization by Carrier Type as of December 31, 2004); adjusted for porting using *Trends in Telephone Service*, Federal Communications Commission, Apr. 2005, at 8-15 (Table 8.10: Telephone Number Porting Activity Since Wireless Pooling Started). In NRUF, carriers do not report numbers that have been ported to them. See Section V.B.2, Local Number Portability, *supra*. Therefore, in order to develop an estimate of wireless subscribership, it is necessary to adjust the raw NRUF data to account for wireless subscribers who have transferred their wireline numbers to wireless accounts. Porting adjustments are developed from the telephone number porting database managed by the Local Number Portability Administrator, which is currently NeuStar, Inc. The database contains all ported numbers currently in service. It also contains information about when the number was most recently ported (to a carrier other than the carrier to which the number originally was assigned) or, in some cases, when the database was updated to reflect a new area code. *Trends in Telephone Service*, Federal Communications Commission, Apr. 2005, at 8-2 – 8-3.

³⁹⁹ The nationwide penetration rate is calculated by dividing total mobile telephone subscribers by the total U.S. population. According to the Bureau of the Census, the combined population of the 50 states, the District of Columbia, and Puerto Rico as of July 1, 2004 was estimated to be 297.6 million. See U.S. Census Bureau, *National and State Population Estimates: Annual Population Estimates 2000 to 2004* (visited June 17, 2005) <<http://www.census.gov/popest/states/tables/NST-EST2004-01.xls>>. The number of subscribers refers to the number of separate wireless accounts. A particular individual may have more than one wireless account.

⁴⁰⁰ See *Ninth Report*, at 20669.

⁴⁰¹ See Appendix A, Table 1, *infra*.

⁴⁰² *Id.*

⁴⁰³ *Pay First; The Push Behind Prepaid*. At Sprint PCS, for example, such users are responsible for almost half of new subscription growth. Jesse Drucker, Almar Latour, and Dennis Berman, *Taking no Giants, Sprint Nextel Seeks to Exploit Wireless Growth*, WALL STREET JOURNAL, Dec. 16 2004, at A1. See, also, Simon Flannery and Vance Edelson, *Wireless Carriers Susceptible to Slowing Industry Growth*, Morgan Stanley, Equity Research, May 25, 2005, at 2; Timothy Horan et al., *Raising Wireless Subscriber; Profitability Outlook Improving*, CIBC World (continued....)

164. Digital subscribers made up approximately 97 percent of all wireless subscribers at the end of 2004,⁴⁰⁴ leaving approximately 7 million analog-only mobile telephone subscribers.⁴⁰⁵

b. Mobile Data

165. The number of mobile data users appears to be rising both absolutely and as a percentage of the mobile telephone subscriber base. The *Ninth Report* cited one estimate that almost 25 percent of U.S. mobile subscribers can be considered casual data users, most of whom use SMS and some of whom use picture mail, download ring tones or do simple web surfing.⁴⁰⁶ Based on figures reported by some of the nationwide carriers, it appears that the percentage of mobile telephone subscribers who use mobile data services has increased significantly in the past year. As noted previously in Section IV.B.6 on mobile data services, Cingular and Verizon have reported that about a third of their customers are mobile data users, while the number of data subscribers reported by Sprint in the fourth quarter of 2004 indicates that slightly more than 40 percent of its customers are mobile data users.⁴⁰⁷ In addition, a recent survey by Yankee Group of 5,200 adults found that 33 percent of Americans between 25 and 34 text-message regularly, up from 24 percent in 2004.⁴⁰⁸ Mobile data services are particularly popular among teenagers and young adults. According to the same Yankee Group survey, the rate of text messaging by people between the ages of 35 and 44 remained at about 25 percent in both years, while usage by people ranging in age from 18 to 24 grew to 62 percent from 52 percent in the same period.⁴⁰⁹

166. In contrast with text messaging and other handset-based mobile data applications, subscriber numbers for paging continue to drop. Using NRUF data, we estimate there were 8.5 million paging units in service as of the end of 2004, down 24 percent from 11.2 million units at the end of 2003, and down 40 percent from 14.1 million units at the end of 2002.⁴¹⁰

c. Satellite

167. According to satellite industry analysis firm TelAstra, estimates place the number of subscribers to mobile satellite telephone services worldwide, including the United States, at 892,000 at

(Continued from previous page) —————

Markets, Equity Research, May 12, 2005, at 2; Daniel Henriques et al., *Global Telecom Weekly*, Goldman Sachs, Equity Research, Feb. 4, 2005, at 1.

⁴⁰⁴ *US Wireless Matrix 4Q04*, at 18. See, also, Colette M. Fleming et al., *Wireless 411*, UBS Warburg, Equity Research, Jan. 5, 2005, at 18 (also estimating 97 percent) (“*Wireless 411*”). CTIA found a similar rate: More than 96 percent of subscribers of responding carriers in its YE2004 survey were digital (CTIA estimated the digital percentage for its total estimate of subscribers at 94.6). *Dec 2004 CTIA Survey*, at 48-49.

⁴⁰⁵ Based on digital penetration rates found in, *US Wireless Matrix 4Q04*, at 18. Subscribers that can access both the digital and analog networks of carriers are considered to be digital subscribers.

⁴⁰⁶ *Ninth Report*, at 20670.

⁴⁰⁷ *Verizon Reports Strong 4Q and 2004 Results, Driven by Wireless Revenue Growth, Solid Cash Flows and Margins*, News Release, Verizon Communications Inc., Jan. 27, 2005, at 7; *First Quarter 2005 Financial and Operational Results*, Presentation, Cingular Wireless, Apr. 20, 2005, at 13; *Sprint Reports Fourth Quarter and Full-Year 2004 Results*, News Release, Sprint, Feb. 3, 2005, at 1 and 4.

⁴⁰⁸ Li Yuan, *Text Messages Sent by Cellphone Finally Catch on in U.S.*, WALL STREET JOURNAL, AUG. 11, 2005.

⁴⁰⁹ *Id.*

⁴¹⁰ Craig Stroup and John Vu, *Numbering Resource Utilization in the United States as of December 31, 2004*, Federal Communications Commission, Aug. 2005, at 12 (Table 1: Number Utilization by Carrier Type as of December 31, 2004).

the end of 2004, up from the estimate of 885,000 subscribers cited in the *Ninth Report*.⁴¹¹

2. Minutes of Use

168. Wireless subscribers continue to increase the amount of time they communicate using their wireless phones. Average minutes-of-use per subscriber per month (“MOUs”) jumped again in 2004, to 680 minutes, or more than 11 hours of use, for the average subscriber of a nationwide operator in the last quarter of the year.⁴¹² This is an increase of 80 MOUs, or more than one hour of additional use, from a year earlier.⁴¹³ Sprint PCS, the nationwide operator with the highest MOUs, averaged just under 1,000 MOUs per month per subscriber.⁴¹⁴ According to CTIA, MOUs averaged 584 between June and December 2004, an increase of 15 percent from the average of 507 MOUs reported during the same period in 2003, and an increase of 37 percent from an average of 427 MOUs from the same period in 2002.⁴¹⁵

169. Increasing MOUs are a result of the demand-stimulating effect of falling prices and the wider acceptance of and reliance upon wireless service.⁴¹⁶ One analyst attributed increasing MOUs to “increasing adoption of the wireless handset as the primary means of voice communications.”⁴¹⁷

3. Mobile Data Usage

170. Data on the use of handset-based mobile data applications are fragmentary and their availability varies with the particular type of application. By a number of indicators, however, handset-based mobile data applications have been gaining popularity among U.S. mobile subscribers. For example, the volume of SMS traffic continued to increase at a rapid pace in the past year. CTIA estimates that SMS traffic volume grew to 4.66 billion per month in December 2004, more than double the 2 billion messages per month reported in December 2003.⁴¹⁸ In addition to tracking the volume of SMS messages sent in June and December of each year, beginning with the second half of 2004 CTIA now collects SMS traffic volumes for the entire six-month period of its semi-annual survey. The reported SMS traffic volume for the period July through December 2004 was 24.7 billion messages.⁴¹⁹

171. While text messaging continues to be the most widely used messaging service, the volume of photo messaging and other multimedia messaging services is also growing. Cingular reported that 30 million multimedia messages were sent or received by its customers in the first quarter of 2005, as

⁴¹¹ Private communication, TelAstra; *Ninth Report*, at 20670

⁴¹² *US Wireless Matrix 4Q04*, at 26.

⁴¹³ *Id.* According to one survey, only 22 percent of wireless subscribers use all of their available minutes on a monthly basis, suggesting there is considerable potential for further growth. *Most Wireless Minutes Are Unused, Study Finds*, MOBILE PIPELINE NEWS, Aug. 5, 2004 (citing a study by telecom market research firm TNS Telecoms).

⁴¹⁴ *US Wireless Matrix 4Q04*, at 26.

⁴¹⁵ See Appendix A, Table 8, *infra*. CTIA aggregated all of the carriers’ MOUs from July 1 through December 31, then divided by the average number of subscribers, and then divided by six.

⁴¹⁶ See, e.g., *Wireless 411*, at 45 (“[G]rowth in usage remains robust for the most part despite the already high levels. We believe this is a function of the lower effective price per minute charged”).

⁴¹⁷ *Wireless Handsets*, Merrill Lynch, Equity Research, Jun. 4, 2004, at 9.

⁴¹⁸ Robert F. Roche, *CTIA’s Wireless Industry Indices*, CTIA-The Wireless Association, June 2005, at 226-227.

⁴¹⁹ *Id.*

compared with four billion text messages.⁴²⁰ Verizon's customers sent 41.4 million multimedia messages and 3.6 billion text messages during the same period.⁴²¹

172. Entertainment applications such as ringtones and games also continued to grow in popularity. It is estimated that about 250 million ringtones were downloaded by U.S. cellphone users in 2004.⁴²² Cingular reported 50 million premium content downloads by its customers in the first quarter of 2005, and Verizon Wireless reported 34.1 million content downloads in the same period.⁴²³

173. The results of an online market research survey designed to assess current usage of mobile data services are broadly consistent with the picture emerging from the aggregate data on mobile data usage cited above.⁴²⁴ Online interviews were conducted with 1000 young consumers ranging in age from 13 to 34 in March 2005. Respondents were asked to estimate how often they used certain wireless phone features or applications in the past month. Text messaging was the most commonly used service, with 49 percent of the respondents using text messaging at least once in the previous month. Taking a photo with a phone was the next most popular service, garnering 30 percent usage in the previous month. Instant messaging was the third most popular service, at 20 percent usage, followed by web browsing (19 percent), photo messaging (19 percent), downloading ringtones (19 percent), using email (16 percent), receiving traffic or news alerts (13 percent), downloading a game to be played (12 percent), taking a video with a phone (10 percent), and video messaging (8 percent).

4. Sub-National Penetration Rates

174. NRUF data is collected on a small area basis and thus allows the Commission to compare the spread of mobile telephone subscribership across different areas within the United States.⁴²⁵ EAs, which are defined by the Department of Commerce's Bureau of Economic Analysis, are particularly well-suited for comparing regional mobile telephone penetration rates for two reasons.⁴²⁶ First, the defining aspect of mobile telephone is, of course, mobility. Each EA is made up of one or more economic nodes and the surrounding areas that are economically related to the node. The main factor used in determining the economic relationship between the two areas is commuting patterns, so that each EA includes, as far

⁴²⁰ John Byrne *et al.*, *Wireless Telecom Investor*, Number 208, Kagan Research, LLC, June 6, 2005, at 5 ("*Kagan Wireless Newsletter*").

⁴²¹ *Id.*

⁴²² Gary Strauss, *Cell Phone Ringtones Dial Into Pop Culture*, USA TODAY, June 2, 2005.

⁴²³ *Kagan Wireless Newsletter*, at 5.

⁴²⁴ *Next Generation Wireless Multimedia Services*, TMNG Market Research, July 2005, at 3 and 5.

⁴²⁵ NRUF data is collected by the area code and prefix (NXX) level for each carrier, which enables the Commission to approximate the number of subscribers that each carrier has in each of the approximately 18,000 rate centers in the country. Rate center boundaries generally do not coincide with county boundaries. However, for purposes of geographical analysis, the rate center data can be associated with a geographic point, and all of those points that fall within a county boundary can be aggregated together and associated with much larger geographic areas based on counties, for which population and other data exists. Aggregation to larger geographic areas reduces the level of inaccuracy inherent in combining unlike areas such as rate center areas and counties.

⁴²⁶ There are 172 EAs, each of which is an aggregation of counties. See Kenneth P. Johnson, *Redefinition of the EA Economic Areas*, SURVEY OF CURRENT BUSINESS, Feb. 1995, at 75 (*Redefinition of the EA*). For its spectrum auctions, the FCC has defined four additional EAs: Guam and the Northern Mariana Islands (173); Puerto Rico and the U.S. Virgin Islands (174); American Samoa (175); and Gulf of Mexico (176). See FCC, *FCC Auctions: Maps* (visited Mar. 25, 2002) <<http://wireless.fcc.gov/auctions/data/maps.html>>. In November 2004, the Bureau of Economic Analysis released updated definitions of EAs; however, for this report we use the previous release of definitions. See *New BEA Economic Areas For 2004*, Bureau of Economic Analysis, Nov. 17, 2004.

as possible, the place of work and the place of residence of its labor force.⁴²⁷ Thus, an EA would seem to capture the market where the average person would shop for and purchase his or her mobile phone most of the time – near home, near the workplace, and all of the places in between. Second, wireless carriers have considerable discretion in how they assign telephone numbers across the rate centers in their operating areas.⁴²⁸ In other words, a mobile telephone subscriber can be assigned a phone number associated with a rate center that is a significant distance away from the subscriber's place of residence or usage (but generally still in the same EA).⁴²⁹

175. Regional penetration rates for the 172 EAs covering the 50 United States, sorted by EA population density, can be seen in Appendix A, Table 3.⁴³⁰ The rates range from a high of 80 percent in the Atlanta, GA-AL-NC EA (EA 40) to a low of 37 percent in the San Angelo, TX EA (EA 129). 151 EAs (half as many more than in 2003), with a combined population of 271 million, have penetration rates of over 50 percent. Sixteen EAs, with a combined population of 60 million, have penetration rates of over 70 percent (there were none in 2003). The Anchorage, AK EA (EA 171), with the lowest population density, had a penetration rate of 51 percent, while the Tampa-St. Petersburg-Clearwater, FL EA (EA 34), with the highest density, had a penetration rate of 72 percent. As previously stated, based on an analysis of NRUF data, the national penetration rate is 62 percent.

C. Quality of Service

176. To evaluate the quality of service, this section summarizes the results of relevant consumer satisfaction surveys and reports on the incidence of customer complaints. When examining such indicators of the quality of mobile telephone service, it is important to keep in mind that they are based on consumers' subjective perceptions of service quality. There are several points to note in this regard. First, mobile telecommunications service is an experience good, and therefore the quality of the product is unknown until the consumer actually uses it. Second, the perceived quality of any good or service depends partly on its price, and a consumer's evaluation of the relationship between price and quality determines his or her level of satisfaction. As stated in one survey of cellular customer satisfaction, "When customers make a purchase, they are choosing a price/quality package that they expect to meet their needs and desires. Ordinarily, higher price is associated with higher quality."⁴³¹ Third, consumer perceptions can change independently of actual changes in network performance as their expectations evolve.

177. Finally, service quality in this market is dependent on when and where the service is

⁴²⁷ *Redefinition of the EA*, at 75.

⁴²⁸ According to one analyst, wireless carriers assign numbers so as to minimize the access charges paid to local wireline companies. See Linda Mutschler *et al.*, *Wireless Number Portability*, Merrill Lynch, Equity Research, Jan 9, 2003, at 8 ("For wireless operators, the standard practice is to aggregate phone numbers within the same area code onto the same or several rate centers, whose physical locations would result in the least amount of access charges paid to ILECs. Therefore, in each market, wireless operators are present in only a small number of rate centers. According to our industry sources, this percentage is probably below 20%, and could be meaningfully lower than 20%.").

⁴²⁹ "Once the NPA-NXX (i.e., 212-449) is assigned to the wireless carrier, the carrier may select any one of its NPA-NXXs when allocating that number to a particular subscriber. Therefore, with regard to wireless, the subscriber's physical location is not necessarily a requirement in determining the phone number assignment – which is very different from how wireline numbers are assigned." Linda Mutschler *et al.*, *US Wireless Services: Wireless Number Portability – Breaking Rules*, Merrill Lynch, Equity Research, Feb. 28, 2003, at 3.

⁴³⁰ See also, Appendix B, Map 4, *infra*.

⁴³¹ Vivian Witkind Davis, *Consumer Utility Benchmark Survey: Consumer Satisfaction and Effective Choice for Cellular Customers*, The National Regulatory Research Institute at The Ohio State University, Nov. 2003, at 4.

used. In this regard, service quality concerns may stem from customer expectations that mobile phone service should be available at all times and at all points within the coverage area. Many mobile phone providers make maps of their service areas available to their subscribers either at their service stores or on their websites. These maps typically contain disclaimers to the effect that the maps only show approximate coverage areas and are not a guarantee of coverage, or warnings that even in areas with a strong signal, service may be adversely affected by the volume of traffic on the network.⁴³² Nevertheless, customers may expect to be able to complete all calls and use all services within the entire service areas shown on the maps. When the full range of expected services is not available, consumer expectations may not be met.

178. According to the J.D. Power and Associates 2004 U.S. Wireless Regional Customer Satisfaction Index Study (“Wireless CSI Study”), overall satisfaction with wireless service providers has increased five percent over 2003, the first time a significant increase has been achieved on a year-to-year basis in three years.⁴³³ The Wireless CSI Study measures customer satisfaction based on 42 specific service-related measures grouped into six key factors that impact overall wireless carriers performance. These six factors are, in order of importance: call performance and reliability (26 percent); customer service (17 percent); service plan options (17 percent); brand image (14 percent); cost of service (14 percent); and billing (12 percent). The study also ranks carriers across six regions in the United States. The 2004 Wireless CSI Study is based on responses from 21,700 households.

179. J.D. Power and Associates interprets the results of the 2004 Wireless CSI Study as evidence that “carriers may be finally catching up with customer expectations, particularly in areas where the industry has been concentrating most of its financial resources.”⁴³⁴ For example, the area of call quality received the largest reported increase in satisfaction ratings over 2003 - a 7 percent increase - with coverage attributes such as “making calls outside the local calling area” and “geographic size of local calling area” experiencing the largest positive changes.⁴³⁵ Satisfaction with the cost of service also rose significantly, mainly due to a strong increase in “fairness in roaming charges.”⁴³⁶

180. A more recent J.D. Power and Associates survey, this one focusing specifically on call quality, also shows an improvement in service quality in the past year.⁴³⁷ According to the J.D. Power and Associates 2005 Wireless Call Quality Performance Study,⁴³⁸ the average number of initial connection problems dropped 50 percent compared to 2004, despite an increase in wireless calling volume. In particular, the study found that three out of every 100 calls includes at least one call quality

⁴³² *T-Mobile Offers More Details On Coverage; Consumers Get Less Static on Cellular Coverage.*

⁴³³ *J.D. Power and Associates Reports Satisfaction With Wireless Service Providers Increases Significantly as Customers Report Higher Ratings in Call Quality and Cost-Related Attributes*, Press Release, J.D. Power and Associates, Sept. 9, 2004 (“*J.D. Power and Associates Wireless Customer Satisfaction Study*”).

⁴³⁴ *Id.*

⁴³⁵ *Id.*

⁴³⁶ *Id.*

⁴³⁷ *J.D. Power and Associates Reports The Number of Wireless Calls Experiencing a Problem with Initial Connections Declines 50 Percent, Despite an Increase in Calling Volume*, Press Release, J.D. Power and Associates, Aug. 2005.

⁴³⁸ *Id.* The 2005 study employs a call quality index based on seven customer-reported problem areas that impact overall carrier performance. These are (in order of importance): static/interference (39 percent); connection on first try (24 percent); voice distortion (12 percent); no echoes (10 percent); dropped/disconnected calls (9 percent); no immediate voice mail notification (4 percent); and no immediate text message notification (2 percent). The study is based on the experiences reported by 22,730 wireless users.

problem with the initial connection, down from six out of 100 in 2004. The senior director of wireless services at J.D. Power and Associates credits competition with the improvement: “With an increasingly competitive environment and an increase in calling volumes, carriers that offer superior network quality will improve their likelihood of attracting new customers and will retain more of their existing base.”⁴³⁹ However, the study also found that wireless call quality depends on geography, with customers who live in non-metro areas typically reporting significantly higher call quality problem rates than those who live in metro areas.⁴⁴⁰ By way of explanation, J.D. Powers and Associates note that “coverage is typically more robust in high population areas due to the close proximity of cell towers.”⁴⁴¹

181. According to a USA Today/CNN/Gallup Poll conducted in March 2005, 83 percent of cellphone owners said they were “very satisfied” or “somewhat satisfied.”⁴⁴² This finding compares favorably with the customer satisfaction rates found by earlier surveys of mobile phone service customers that were cited in the *Ninth Report* and previous reports.⁴⁴³ Like the J.D. Power and Associates survey, however, the USA Today/CNN/Gallup Poll results indicate that cellphone users continue to experience problems. In particular, nearly half of the respondents consider dropped calls a major or minor issue, and 42 percent feel the same way about confusing bills.⁴⁴⁴ In addition, 59 percent of respondents think service contracts that lock in for a period of time are a major or minor problem, and 53 percent feel that the cost of service is a major or minor problem.

182. Another view of service quality comes from an annual cellphone service customer satisfaction survey conducted in September 2004 by Consumer Reports magazine of some 39,000 subscribers to its Web site (ConsumerReports.org).⁴⁴⁵ In contrast to the marked improvement in the J.D. Power and Associates customer satisfaction index from 2003 to 2004, the Consumer Reports survey found that the overall satisfaction index has changed by only one point in the past three years, from 65 to 66. Moreover, in contrast to the 83 percent customer satisfaction rate found by the USA Today/CNN/Gallup Poll, only 45 percent of respondents to the Consumer Reports survey said they were completely satisfied or very satisfied with their cellphone service. This gives cellphone service a lower level of overall customer satisfaction than most other services the magazine measures, including hotels (67 percent), supermarkets (67 percent), and homeowners’ insurance (77 percent).⁴⁴⁶ Nearly 70 percent of those who use a cellphone frequently had a least one dropped call in the week before the survey, and nearly 60 percent said they had a bad connection. Only 31 percent said the provider’s response to a service inquiry was very helpful, while 40 percent said responses to billing inquiries were very helpful. The magazine asserts that these survey results explain why 35 percent of its respondents were seriously

⁴³⁹ *Id.*

⁴⁴⁰ *Id.* The higher rate of call quality problems in non-metro areas is particularly the case with respect to dropped/disconnected calls, initial connections, static, and delayed voice mail notification.

⁴⁴¹ *Id.*

⁴⁴² Edward C. Baig, *Cell Phones Top List of What Gets Us Steamed*, USA TODAY, May 18, 2005 (“*Cell Phones Top List of What Gets Us Steamed*”).

⁴⁴³ In particular, a 2002 telephone survey conducted by the General Accounting Office found an 83 percent customer satisfaction rate, and a 2003 online survey conducted by the National Regulatory Research Institute found a 72 percent customer satisfaction rate. See *Ninth Report*, at 20674-20675; *FCC Should Include Call Quality in Its Annual Report on Competition in Mobile Phone Services*, General Accounting Office, GAO-03-501, Apr. 2003, at 27.

⁴⁴⁴ *Cell Phones Top List of What Gets Us Steamed*.

⁴⁴⁵ *Cellular Service*, CONSUMER REPORTS, Feb. 2005, at 18.

⁴⁴⁶ *Cell Phones Top List of What Gets Us Steamed*.

considering switching carriers. According to the deputy editor of Consumer Reports, the survey results indicate that “the chronic problems for cellphone customers are service and billing.”⁴⁴⁷

183. The Commission releases a report on the informal inquiries and complaints processed by its Consumer & Governmental Affairs Bureau (“CGB”) four times a year. Since consumers who submit complaints are self-selected, the data in these reports are not representative of the U.S. population or mobile phone customers as a whole. The report on consumer inquiries and informal complaints during the fourth quarter of calendar year 2004 was issued on March 4, 2005.⁴⁴⁸ Of the services regulated by the FCC, wireless services ranked third behind radio and television broadcasting and wireline telecommunications in terms of number of complaints during the reporting period. Of the 333,812 complaints registered in the fourth quarter, wireless complaints accounted for 4,369, or slightly more than 1 percent of the total. This represented a sharp decline from the 9,120 wireless complaints recorded in the third quarter of 2004.

184. Of those 4,369 complaints from wireless consumers, service quality ranked third behind billing and rates and early termination of service contracts in terms of the number of complaints during the reporting period. In particular, 2,300 of the complaints were related to billing and rates, 670 of the complaints were related to contract and early terminations issues, and 606 of the complaints were related to service quality issues, with the remaining complaints being related to carrier marketing and advertising (537 complaints) and number portability (256 complaints). For purposes of the report, service quality addresses a broad range of disputes and inquiries regarding quality of service or the lack of coverage within a geographic area served by a wireless provider, including dead zones, dropped calls, overall quality of service within the subscriber’s local calling area, network busy signal, and roaming availability.

D. International Comparisons

1. Mobile Voice

185. The *Ninth Report* and previous reports compared mobile market performance in the United States, Western Europe and Asia-Pacific countries of comparable income levels with regard to mobile penetration, usage, and pricing.⁴⁴⁹ As noted in the *Ninth Report*, these comparisons have shown three consistent differences in performance between the U.S. mobile market and mobile markets abroad. First, mobile penetration is significantly higher in Western Europe and developed Asia-Pacific countries than in the United States. Second, average minutes of use per subscriber are significantly higher in the United States than in Western Europe and developed Asia-Pacific countries. Third, revenue per minute, a commonly used proxy for pricing, is significantly lower in the United States than in Western Europe and Japan.

186. More recent data confirm that the same pattern of international differences in mobile market performance continued into the year 2004.⁴⁵⁰ Mobile penetration remains significantly higher in Western Europe and parts of the Asia-Pacific region than in the United States. Mobile penetration

⁴⁴⁷ *Id.*.

⁴⁴⁸ Quarterly Report on Informal Consumer Inquiries and Complaints Released, *News Release*, Federal Communications Commission March 4, 2005.

⁴⁴⁹ *Ninth Report*, at 20676-20678. In accordance with established practice in using international benchmarking for the purpose of assessing effective competition in mobile markets, the comparison of mobile market performance is restricted to Western Europe and parts of the Asia-Pacific in order to ensure that the countries being compared are roughly similar to the United States with regard to their level of economic and telecommunications infrastructure development. *See, for example*, UK regulator Oftel’s review of effective competition in the mobile market: *Effective Competition Review: Mobile*, Office of Telecommunications, Feb. 2001, at 7.

⁴⁵⁰ *See* Appendix A, Table 10, *infra*.

averaged an estimated 95 percent in Western Europe at the end of 2004.⁴⁵¹ In a number of countries, including Italy, the United Kingdom, Sweden, and Portugal, mobile penetration exceeded 100 percent at the end of 2004 due to double counting of subscribers.⁴⁵² As in years past, France finished 2004 with the lowest mobile penetration rate in Western Europe at 74 percent.⁴⁵³ Thus, as in previous years, U.S. mobile penetration at the end of 2004, at approximately 61 percent,⁴⁵⁴ was lower than the lowest mobile penetration rate in Western Europe.

187. Japan finished the year with a mobile penetration level of 71 percent,⁴⁵⁵ somewhat lower than the lowest penetration rate in Western Europe but higher than the U.S. level. In comparison, year-end mobile penetration rates in a number of other Asian-Pacific countries were within the range of European levels, including Australia (89 percent), South Korea (76 percent), Hong Kong (106 percent), and Singapore (90 percent).⁴⁵⁶

188. The United States continues to lead the world in usage, with average MOUs estimated to be approximately 630 per month in the fourth quarter of 2004.⁴⁵⁷ This compares with an average across Western Europe of 137 MOUs, with most Western European countries tightly clustered in the range from 110 to 170 MOUs.⁴⁵⁸ The exceptions include Finland (258), France (225), and, at the low end, Germany (76).⁴⁵⁹ MOUs in comparable Asian-Pacific countries were generally higher than the Western European average, but still well below the U.S. figure, including Japan (154), Australia (168), South Korea (316),

⁴⁵¹ *Global Wireless Matrix 4Q04*, at 3.

⁴⁵² *Id.* As noted in previous reports, reported mobile subscriber figures and penetration may be overstated in some countries, particularly those with a high percentage of prepaid subscribers, due to double counting of subscribers who have switched service providers but have not yet been removed from their former provider's subscriber base, or those who subscribe to multiple mobile service providers and therefore have multiple SIM (Subscriber Identity Module) Cards or handsets. As one analyst report explains, carriers have widely different policies to determine when to cut off inactive subscribers and to remove them from their reported subscriber base. In addition, it is becoming more prevalent for people to subscribe to multiple mobile service providers. *Id.*, at 144. *See, also, Seventh Report*, at 13033, and *Sixth Report*, at 13391.

⁴⁵³ *Global Wireless Matrix 4Q04*, at 3.

⁴⁵⁴ The estimates of mobile penetration, MOUs, and revenue per minute in the United States cited in this section differ somewhat from estimates provided in previous sections of the report because they come from different sources. We rely on the comparative data reported in Merrill Lynch's *Global Wireless Matrix 4Q04* for this section of the report to ensure consistency with the methodology used to compile the data reported for other countries.

⁴⁵⁵ *Id.*

⁴⁵⁶ *Id.* In many West European and Asian countries, prepaid service along with the calling party pays regime may contribute to high mobile penetration. *See OECD Communications Outlook 2005*, at 299.

⁴⁵⁷ *Global Wireless Matrix 4Q04*, at 3 and 8. For purposes of comparing metrics in different countries, average MOUs include both incoming and outgoing minutes, and usually exclude traffic related to mobile data services. MOUs figures are potentially somewhat overstated in the United States, and more generally in countries that do not employ calling party pays, relative to countries that do employ calling party pays, as a result of the double-counting of same-network ("on-net") mobile-to-mobile minutes. The double counting occurs because under the "mobile party pays" system used in the United States the same minute of an on-net call is billed to both the caller and the receiver. *Id.*, at 144-145.

⁴⁵⁸ *Id.*, at 3 and 8. *See, also, Jason Armstrong et al., Wireless Services – Look for Another Strong Year in 2005*, Goldman Sachs, Global Investment Research, Jan. 4, 2005, at 1 (asserting that "In Europe, high call termination rates to wireless phones have effectively kept a ceiling on the minutes traversing wireless networks.").

⁴⁵⁹ *Global Wireless Matrix 4Q04*, at 3 and 8.

Hong Kong (387), and Singapore (282).⁴⁶⁰

189. Revenue per minute⁴⁶¹ in Western Europe averaged \$0.26 in the fourth quarter of 2004, and ranged from a high of \$0.53 in Switzerland to a low of \$0.16 in Finland, with most countries clustered in the range between \$0.18 and \$0.30.⁴⁶² At \$0.08, average revenue per minute in the United States during the same period was therefore less than one-third of the European average and half the lowest revenue per minute in Western Europe.⁴⁶³

190. At \$0.32, revenue per minute in Japan was four times the U.S. figure at the end of 2004 and also higher than the European average, but lower than the European highs of \$0.53 in the Swiss mobile market and \$0.35 in the German mobile market.⁴⁶⁴ In contrast, revenue per minute was nearly as low in some Asian countries as in the United States, including South Korea (\$0.10) and Singapore (\$0.10).⁴⁶⁵ The only developed country with a lower revenue per minute than the United States was Hong Kong, at \$0.06.⁴⁶⁶

191. One of the reasons revenue per minute is higher in Western Europe than in the United States is that the calling party pays system used throughout Western Europe tends to produce higher mobile termination rates, and consequently higher charges for calls to mobile phones, than the mobile party pays system used in the United States.⁴⁶⁷ Apart from the effects of calling party pays, however, this difference in the pricing of mobile telephone service is widely attributed to a less aggressive competitive environment in Western European mobile markets for services paid for by mobile subscribers.⁴⁶⁸ Accordingly, the results of this international comparison can be interpreted as evidence that the U.S. mobile market is effectively competitive relative to mobile markets in Western Europe and also Japan.

2. Mobile Data

192. The *Ninth Report* and previous reports observed that the percentage of mobile service revenues from data services is significantly higher in Western Europe than in the United States.⁴⁶⁹ This difference in mobile data performance continued into 2004. In the fourth quarter of 2004 revenues from mobile data services contributed an estimated 16 percent of European mobile carriers' ARPU on average, and ranged from 7 to 21 percent of ARPU in individual European markets.⁴⁷⁰ This compares with 6

⁴⁶⁰ *Id.*, at 3.

⁴⁶¹ Revenue per minute is calculated by dividing monthly voice-only ARPU by MOUs. For purposes of international comparison, service revenues included in ARPU reflect the fees mobile operators collect from other network operators for terminating incoming calls on their networks as well as monthly service charges and usage fees paid by mobile subscribers. *Id.*, at 145.

⁴⁶² *Id.*, at 3 and 8.

⁴⁶³ *Id.*, at 3.

⁴⁶⁴ *Id.*

⁴⁶⁵ *Id.*

⁴⁶⁶ *Id.*

⁴⁶⁷ *Ninth Report*, at 20679; *Seventh Report*, at 13037. See, also, Jason Armstrong *et al.*, *Wireless Services – Look for Another Strong Year in 2005*, Goldman Sachs, Global Investment Research, Jan. 4, 2005, at 1.

⁴⁶⁸ *Ninth Report*, at 20678-20679; *Eighth Report*, at 14869-14871; *Seventh Report*, at 13036.

⁴⁶⁹ *Ninth Report*, at 20680.

⁴⁷⁰ *Global Wireless Matrix 4Q04*, at 3.

percent of U.S. mobile carriers' ARPU in the same period, double the previous year's figure.⁴⁷¹ The percentage of ARPU derived from mobile data services was even higher in Japan (24 percent) than in Western Europe.⁴⁷² Text messaging, or SMS, continues to be the most popular mobile data service in Western Europe, accounting for an estimated 90 percent of European operators' data revenues.⁴⁷³ One analyst estimates that about 71 percent of European cellphone users send text messages, more than twice the percentage in the United States.⁴⁷⁴ As noted in the *Ninth Report*, one of the reasons Western Europe leads the United States in mobile data usage is that mobile voice is still relatively expensive on a per minute basis in Europe compared to the United States.⁴⁷⁵ European mobile subscribers are more likely to opt for text messaging because it is cheaper than placing a call on their mobile phones.⁴⁷⁶ In contrast, most U.S. mobile subscribers are on calling plans that include large buckets of minutes and are more likely to make a phone call because the incremental cost of a call is close to zero.⁴⁷⁷

193. The number of foreign mobile telephone carriers providing mobile data services over next-generation networks continued to grow in the past year. As noted in the *Ninth Report* and previous reports, while the European Commission had originally targeted the beginning of 2002 as the date for the coordinated introduction of 3G services, European carriers had delayed the launch of commercial WCDMA service until 2003 at the earliest and in most cases 2004.⁴⁷⁸ As of the end of 2003, commercial start-up of WCDMA service in Europe was limited to a small number of carriers in a handful of markets, including Austria, Denmark, Italy, Luxembourg, Sweden and the United Kingdom.⁴⁷⁹ In contrast, by the end of 2004 at least one WCDMA network had been launched in nearly all Western European markets, and three or more WCDMA networks had been launched in a number of markets, including Austria, Germany, Greece, Italy, Portugal, and the United Kingdom.⁴⁸⁰ Even though commercial 3G services are now widely available in Western Europe, analysts and experts continue to stress that consumer use of new services may be limited in the near term due to problems such as download speeds that are much slower than theoretical speeds, patchy coverage (especially inside buildings), and lack of "killer applications" that could drive demand for 3G services.⁴⁸¹

⁴⁷¹ *Id.*; *Ninth Report*, at 20680.

⁴⁷² *Global Wireless Matrix 4Q04*, at 3.

⁴⁷³ Brian Lagrotteria, *R U There?*, WALL STREET JOURNAL, Feb. 14, 2005.

⁴⁷⁴ Li Yuan, *Text Messages Sent by Cellphone Finally Catch on in U.S.*, WALL STREET JOURNAL, AUG. 11, 2005.

⁴⁷⁵ *Ninth Report*, at 20680.

⁴⁷⁶ Frank J. Governali *et al.*, *Wireless Data Prospects Brightening*, Goldman Sachs, Global Investment Research, Apr. 16, 2004, at 12.

⁴⁷⁷ *Id.* See, also, *Text Messages Sent by Cellphone Finally Catch on in U.S.* As noted in the *Ninth Report*, the more rapid spread of mobile data services in overseas markets than in the United States may reflect a variety of factors influencing the demand for mobile data services, including differences in the age composition of the mobile subscriber base, the degree of technological standardization and compatibility among competing mobile networks, the availability of more advanced handsets, wireline Internet penetration rates, and the relative prices of mobile voice, mobile data, and wireline Internet access. See *Ninth Report*, at 20680.

⁴⁷⁸ See *Ninth Report*, at 20681.

⁴⁷⁹ *Id.*

⁴⁸⁰ *Global Wireless Matrix 4Q04*, at 11.

⁴⁸¹ David Pringle, *Not So Fast*, WALL STREET JOURNAL, Feb. 14, 2005; David Pringle, *Slower Growth Hits Cellphone Services Overseas*, WALL STREET JOURNAL, May 23, 2005; Simon Flannery *et al.*, *3G Economics a Cause for Concern*, Morgan Stanley, Equity Research, Feb. 1, 2005, at 6-7.

194. Japan's NTT DoCoMo launched the world's first commercial 3G service over a WCDMA network in October 2001.⁴⁸² As noted in the *Ninth Report*, after two years of relatively sluggish growth, consumer uptake of NTT DoCoMo's WCDMA service, which the company calls FOMA (Freedom of Multimedia Access), picked up speed in late 2003 and the first half of 2004. Rapid adoption of FOMA continued through early 2005, with the number of FOMA subscribers surpassing 12.2 million as of the end of April 2005, up from nearly 3.6 million a year earlier.⁴⁸³ However, because rival Japanese carrier KDDI's CDMA2000 1xRTT-based service enjoyed a rapid adoption rate from the time it was launched in April 2002, NTT DoCoMo's WCDMA service has yet to close the gap. The number of subscribers to KDDI's CDMA2000 service rose to more than 18.2 million at the end of April 2005, up from nearly 14 million the previous year.⁴⁸⁴ KDDI's CDMA2000 subscribers now represent more than 92 percent of its total subscriber base, whereas FOMA subscribers represent nearly a quarter of NTT DoCoMo's total subscriber base. KDDI's packet data service using 1xEV-DO, which was introduced in November 2003, also appears to enjoy a relatively rapid adoption rate, with an estimated 2.55 million subscribers, or about 13 percent of KDDI's total subscriber base, by the end of February 2005.⁴⁸⁵ Data services offered over next-generation CDMA networks continue to be popular with consumers in Korea. South Korea had accumulated a total of over 33 million CDMA2000 subscribers, representing 90 percent of South Korea's total mobile telephone subscriber base, through December 2004, about 10 million of which are using services offered over CDMA2000 1xEV-DO networks.⁴⁸⁶

VII. INTERMODAL ISSUES

A. Wireless – Wireline Competition

195. Once solely a business tool, wireless phones are now a mass-market consumer device.⁴⁸⁷ As the Economist magazine recently noted, "When you leave your house, you probably take your keys, your wallet and your phone."⁴⁸⁸ The overall wireless penetration rate in the United States is now at 62 percent,⁴⁸⁹ and more than 90 percent for the U.S. population between the ages of 20 and 49.⁴⁹⁰ According to one study, two-thirds of all U.S. households have at least one cellphone, with many having more than one.⁴⁹¹

1. Wireless Substitution

196. Total wireless substitution has grown significantly in recent years. According to a 2004

⁴⁸² *Ninth Report*, at 20681.

⁴⁸³ Telecommunications Carriers Association ("TCA"), *Number of Subscribers* (visited May 24, 2005) <<http://www.tca.or.jp/eng/database/daisu/index.html>>.

⁴⁸⁴ *Id.*

⁴⁸⁵ Paul Wuh et al., *DoCoMo Gets 10mn 3G WCDMA Subscribers*, Lehman Brothers, Equity Research, Mar. 8, 2005, at 1.

⁴⁸⁶ *3G Subscribers*, 3G TODAY, (visited May 24, 2005) <<http://www.3gtoday.com/subscribers/index.html>>.

⁴⁸⁷ See *Sixth Report*, at 13381. One analyst estimated that, in 2004, only 25 percent of wireless users were business customers, with the remaining 75 percent being consumers. *10-Year Wireless Projections*, KAGAN WIRELESS TELECOM INVESTOR, June 6, 2005, at 2.

⁴⁸⁸ *A Spiritual Connection*, ECONOMIST, Mar. 10, 2005.

⁴⁸⁹ See Section VI.B.1, Subscriber Growth, *supra*.

⁴⁹⁰ *Diamond in the Rough*, at 4.

⁴⁹¹ *More Cell Phones, Less Satisfaction*, CNET NEWS.COM, Apr. 13, 2005 (citing a Forrester Research study).

survey done for the Centers for Disease Control (CDC), 5.5 percent of adults lived in households with only wireless phones in the second half of 2004, up from 4.4 percent in the first half of 2004 and 2.8 percent in the first half of 2003.⁴⁹² The rate among younger users appears much higher, with roughly 14 percent of 18-24 year-olds living in wireless-only households. According to one analyst, most wireless-only users do not actually cancel their wireline service; instead, they simply never sign up for wireline when making an initial phone service decision.⁴⁹³

197. Even when not “cutting the cord” completely, consumers appear increasingly to choose wireless service over traditional wireline service, particularly for certain uses. A recent study showed that one-third of all households receive more than half of their calls on wireless phones, with 9 percent receiving almost all their calls wirelessly.⁴⁹⁴ In the *Ninth Report*, we discussed the pressures that wireless growth is placing on companies which offer wireline services.⁴⁹⁵ In 2004 these trends continued, as the number of landlines declined by around 1.2 percent quarterly in the second and third quarters of 2004, and wireline long distance voice revenues continued to erode.⁴⁹⁶ At the end of 2004, there were more wireless subscribers than wireline in the United States - 176 million access lines versus more than 184 million wireless subscribers.⁴⁹⁷ In response, some incumbent wireline companies are beginning to focus more on their fast-growing wireless businesses,⁴⁹⁸ where, nationwide, service revenues grew by 12 percent in 2004.⁴⁹⁹ One wireline executive remarked, “We are not looking at ourselves as a phone company anymore.”⁵⁰⁰

198. These trends appear to be due to the relatively low cost, widespread availability, and increased use of wireless service. As we discussed in past reports, a number of analysts have argued that wireless service is cheaper than wireline, particularly if one is making a long-distance call or when traveling.⁵⁰¹ As one analyst put it more recently, “For many customers, wireless is cheaper with greater

⁴⁹² Stephen Blumberg, *Household Telephone Service and Usage Patterns in the US in 2004*, data presented at “U.S. Household Telephone Usage Patterns In 2004: A Focus on Cell Phone Usage,” seminar hosted by the Bureau of Labor Statistics, Washington, DC, Jun. 16, 2005. Another recent study found that 6 percent of U.S. households are wireless only. Clyde Tucker, *Household Telephone Service and Usage Patterns in the United States in 2004*, data presented at “U.S. Household Telephone Usage Patterns In 2004: A Focus on Cell Phone Usage,” seminar hosted by the Bureau of Labor Statistics, Washington, DC, Jun. 16, 2005.

⁴⁹³ Jason Armstrong *et al.*, *Americas: Telecom Wireless*, Goldman Sachs, Equity Research, Jan. 4, 2005, at 1.

⁴⁹⁴ This percentage includes wireless-only households. Clyde Tucker, *Household Telephone Service and Usage Patterns in the United States in 2004*, data presented at “U.S. Household Telephone Usage Patterns In 2004: A Focus on Cell Phone Usage,” seminar hosted by the Bureau of Labor Statistics, Washington, DC, Jun. 16, 2005.

⁴⁹⁵ See *Ninth Report*, at 20684.

⁴⁹⁶ Jesse Drucker, Almar Latour, and Dennis Berman, *Taking no Giants, Sprint Nextel Seeks to Exploit Wireless Growth*, WALL STREET JOURNAL, Dec. 16 2004, at A1; Anne Marie Squeo, *In Tiny Towns, Call Options Shake Up an Old Phone System*, WALL STREET JOURNAL, Feb. 22, 2005, at A1.

⁴⁹⁷ Timothy Horan *et al.*, *Transfer of Coverage: We Favor Wireless and Cable Over Wireline*, CIBC World Markets, Equity Research, May 3, 2005, at 2.

⁴⁹⁸ Jesse Drucker, Almar Latour, and Dennis Berman, *Taking no Giants, Sprint Nextel Seeks to Exploit Wireless Growth*, WALL STREET JOURNAL, Dec. 16 2004, at A1; Almar Latour and Shawn Young, *Verizon Considers Shedding Portion Of Its Local Lines*, WALL STREET JOURNAL, Oct. 29, 2004; COMMUNICATIONS DAILY, Oct. 22, 2004.

⁴⁹⁹ *US Wireless Matrix 4Q04*, at 21.

⁵⁰⁰ Christopher Rhoads, *Outside the Lines*, WALL STREET JOURNAL, Sept. 13, 2004, at R6.

⁵⁰¹ See *Eighth Report*, at 14832-14833; *Ninth Report*, at 20684-20685.

utility than wireline – in contrast to perceptions, wireless prices have indeed been falling, making it more competitive with wireline.”⁵⁰² The analyst later added:

For your mere \$40 or \$50 or \$60 plan with mega-minutes, you also get voice mail, caller ID, 3-way calling, call waiting, and call forwarding thrown in. On the wireline these features will cost you between \$15 to \$20. And don’t forget, you get mobility to boot. Who cares if the call gets dropped once in a while. The utility is great!⁵⁰³

2. Wireless Alternatives

199. The number of mobile wireless carriers offering service plans designed to compete directly with wireline local telephone service continues to increase. These plans offer unlimited local calling for around \$30 to \$40 a month.⁵⁰⁴ The largest of such providers, Leap, under its “Cricket” brand, offers mobile telephone service in 39 markets in 20 states.⁵⁰⁵ At the end of 2004, Leap had over 1.5 million customers.⁵⁰⁶ Leap claims that 52 percent of its customers do not have a wireline phone at home, up from 43 percent one year ago.⁵⁰⁷ In addition, 93 percent of Leap customers use the service as their primary phone.⁵⁰⁸ According to Leap, its customers average approximately 1,500 minutes of use per month.⁵⁰⁹ MetroPCS, which began offering a similar unlimited calling plan in 2002, had 1.5 million customers as of February 2005.⁵¹⁰ MetroPCS offers service in California, Florida, and Georgia.⁵¹¹

200. As discussed in the *Ninth Report*, such unlimited local wireless calling plans are now common.⁵¹² No fewer than 17 regional and local competitors offered similar plans in 41 states.⁵¹³ In addition, in 2005, many national carriers expanded calling plans that are effectively unlimited, with 1,000 “anytime” minutes and unlimited night and weekend minutes for around \$40-\$65 per month.⁵¹⁴ One analyst commented on the recent addition of “bells and whistles,” such as text messaging and long-distance service, into these plans, “as carriers seek to provide customers a comprehensive alternative to

⁵⁰² Frank Governali *et al.*, *Global Telecom Weekly*, Goldman Sachs, Equity Research, Aug. 9, 2004, at 2.

⁵⁰³ *Id.*

⁵⁰⁴ John Byrne, *Unlimited Local Plans Poliferate*, KAGAN WIRELESS MARKET STATS, Oct. 15, 2004, at 2.

⁵⁰⁵ *Leap Reports Results for Fourth Quarter and Full Year 2004*, News Release, Leap, May 11, 2005.

⁵⁰⁶ *Id.*

⁵⁰⁷ *Leap Blows Away Industry Average for Landline Displacement*, News Release, Leap, Mar. 14, 2005.

⁵⁰⁸ *Id.*

⁵⁰⁹ *Id.*

⁵¹⁰ *MetroPCS Announces Signing of 1.5 Millionth Customer*, News Release, MetroPCS, Feb 28, 2005.

⁵¹¹ See MetroPCS, *more about metroPCS* (visited May 23, 2005) <<http://www.metropcs.com/about/moreaboutmetropcs.shtml>>.

⁵¹² See *Ninth Report*, at 20685-20686.

⁵¹³ John Byrne, *Unlimited Local Plans Poliferate*, KAGAN WIRELESS MARKET STATS, Oct. 15, 2004, at 2-3. See, also, Cricket, *Cell Phone Specials* (visited May 23, 2005) <<http://www.mycricket.com/>>.

⁵¹⁴ See, e.g., T-Mobile, *Get the Nation’s Most Whenever Minutes with the free Motorola V188* (visited May 23, 2005) <<http://www.t-mobile.com/promos/online/1000min6010/>>; Cingular, *Mobile Phone Deals & Cellular Service Plans that Fit you Best!* (visited May 23, 2005) <<http://www.cingular.com/>>; and Verizon Wireless, *America’s Choice* (visited May 23, 2005) <<http://www.verizonwireless.com/b2c/index.jsp>>.

wired service.”⁵¹⁵

B. Wireless Local Area Networks

201. Wireless Local Area Networks⁵¹⁶ are playing an increasingly important role as a competitor and supplement to the services offered by the CMRS industry.⁵¹⁷ WLANs enable consumers to obtain high-speed wireless Internet connections within certain locations at a range of 150 to 250 feet.⁵¹⁸ The most prevalent WLAN technology is equipment manufactured in accordance with the IEEE 802.11 family of standards, commonly known as “Wi-Fi,” short for wireless fidelity. Basic WLAN data transfer rates range from speeds of up to 11 Mbps for 802.11b and up to 54 Mbps for 802.11a and 802.11g. Two Wi-Fi manufacturers, D-Link and Netgear, are currently offering rebates which make the effective purchase price of an 802.11g card, a faster standard, less than the price of a slower 802.11b card.⁵¹⁹ New “SpeedBoost” or “Super G” routers, marketed as “pre-802.11n,” employ MIMO (Multiple Input Multiple Output) technology, making them capable of providing speeds of up to 108 Mbps.⁵²⁰

202. WLAN users can get high-speed Internet connections at so-called “hot spots,” including locations such as restaurants, coffee shops, hotels, airports, convention centers, and city parks, streets, and squares.⁵²¹ Estimates on the number of public Wi-Fi hot spots vary considerably. Wi-Fi411 estimates 12,509 in the United States.⁵²² However, Intel’s website counts 25,877 Wi-Fi locations in United States.⁵²³ The Gartner Group predicts there will be more than 150,000 hotspots worldwide by the end of 2005.⁵²⁴ Gartner has also estimated that the number of hotspot users worldwide will total 30 million by the end of 2004, up from 9.3 million in 2003 and 2.5 million in 2002.⁵²⁵ The use of WLANs to access the Internet is becoming so common, that, according to one estimate, 75 percent of all laptop computers being shipped today have Wi-Fi built-in as original equipment.⁵²⁶

⁵¹⁵ John Byrne, *Unlimited Local Plans Proliferate*, KAGAN WIRELESS MARKET STATS, Oct. 15, 2004, at 2.

⁵¹⁶ For a comprehensive discussion of WLAN technologies and deployment, see, generally, *Wireless Broadband Access Task Force Report*.

⁵¹⁷ Services provided over WLANs are not CMRS services. See 47 C.F.R. §§ 20.3, 20.9 for a discussion of commercial mobile radio services. WLANs are permitted to operate on an unlicensed basis under Part 15 of the FCC’s rules. See 47 C.F.R. §15, et seq.

⁵¹⁸ Kenneth R. Carter, Ahmed Lahjouji, and Neal McNeal, *Unlicensed and Unshackled: A Joint OSP-OET White Paper on Unlicensed Devices and Their Regulatory Issues*, OSP Working Paper #39, May 2003, at 28-29. (“*OSP-OET White Paper*”)

⁵¹⁹ See Doug Mohney, *802.11b on edge of extinction: Bye bye Sooty, bye bye*, THE INQUIRER, Apr. 11, 2005. <<http://www.theinquirer.net/?article=22443>>.

⁵²⁰ *Id.*

⁵²¹ See *Seventh Report*, at 13062-13063. Hot spots typically rely on high-speed landline technologies, such as T-1 lines, DSL, or cable modems, to connect to the PSTN and Internet.

⁵²² See <<http://www.wifi411.com/>> (visited May 18, 2005).

⁵²³ See <http://intel.jiwire.com/hot-spot-directory-browse-by-state.htm?country_id=1> (visited May 18, 2005).

⁵²⁴ *Wireless Broadband Access Task Force Report*, at 30-31.

⁵²⁵ *Id.*, at 30; *Gartner Says the Number of Hotspot Users Worldwide to Triple in 2004*, Press Release, Gartner, Inc., Feb. 18, 2004.

⁵²⁶ See Corilyn Shropshire, *Why Pay for Wi-Fi? As Wireless Internet Hot Spots Proliferate, So Do Demands for Free Service*, PITTSBURGH POST-GAZETTE, Feb. 7, 2005.

203. As noted in the *Ninth Report*, several mobile telephone carriers have entered the hot spot operation business through acquisitions, partnerships, or independent deployments.⁵²⁷ Generally, mobile telephone carriers offer WLAN services to augment their voice service offerings with data access.⁵²⁸ Subscribers to carriers' WLAN services may choose from a wide range of service plans including annual access, month-to-month access, daily access, and metered access.⁵²⁹ In the past year mobile carriers continued to extend their Wi-Fi coverage by entering into agreements with other carriers. T-Mobile now claims 5,675 hotspots where its customers can get connectivity.⁵³⁰ Nextel is partnering with Boingo Wireless and Wayport, and claims about 7,000 hotspots.⁵³¹ Sprint reports that it offers service at 19,000 hotspots through roaming agreements.⁵³² In May 2003, Verizon Online announced that it would upgrade 200,000 pay phones in Manhattan to offer free Wi-Fi as a free add-on for its residential broadband DSL subscribers.⁵³³ More recently, however, Verizon Wireless announced that the company would expand its CDMA2000 1xEV-DO service in New York City and begin to phase out its some 360 Wi-Fi payphone hotspots for its online Internet access customers.⁵³⁴

VIII. CONCLUSION

204. Even with fewer nationwide mobile telephone carriers to choose from, U.S. consumers continue to benefit from robust competition in the CMRS marketplace. During 2004, the CMRS industry experienced another year of growth, demonstrating the continuing demand for and reliance upon mobile services. As of December 2004, we estimate there were approximately 184.7 million mobile telephone subscribers, which translates into a nationwide penetration rate of roughly 62 percent.⁵³⁵ Consumers continue to increase their use of mobile telephones for both voice and data services. Partly because of the prevalence of mobile service packages with large buckets of inexpensive minutes, the average amount of time U.S. mobile subscribers spend talking on their mobile phones rose to 580 minutes per month in the

⁵²⁷ *Ninth Report*, at 20687.

⁵²⁸ See *Wireless Broadband Access Task Force Report*, at 74.

⁵²⁹ See, for example, Sprint PCS, *PCS for Business: Voice and Data* (visited May 20, 2004) <<https://wifi.sprintpcs.com/signup/terms.aspx>>; T-Mobile, *T-Mobile Hotspot: Service Plans* (visited May 20, 2004) <https://selfcare.hotspot.t-mobile.com/#!/services_plans.do>.

⁵³⁰ See, for example, T-Mobile, *T-Mobile Hotspot U.S. Location Map* (visited May 18, 2005) <<http://locations.hotspot.t-mobile.com/>>. The Nextel hotspot service alone is available for laptops for a monthly fee of \$39.99. With Wireless PC Access added, the service is charging a promotional rate of \$54.99 per month (visited May 18, 2005) <http://nextelonline.nextel.com/en/solutions/dataaccess/wifi_hotspot_plan.shtml>.

⁵³¹ See, for example, T-Mobile, *T-Mobile Hotspot U.S. Location Map* (visited May 18, 2005) <<http://locations.hotspot.t-mobile.com/>>. The Nextel hotspot service alone is available for laptops for a monthly fee of \$39.99. With Wireless PC Access added, the service is charging a promotional rate of \$54.99 per month (visited May 18, 2005) <http://nextelonline.nextel.com/en/solutions/dataaccess/wifi_hotspot_plan.shtml>.

⁵³² *Sprint Extends Wi-Fi Leadership and Broadband Footprint Globally*, Press Release (visited May 18, 2005) <http://www2.sprint.com/mr/news_dtl.do?id=6320>. Sprint PCS offers pay-as-you-go Wi-Fi access for \$9.95 for 24 hours of unlimited usage in a supported location. It also has a month-to-month plan for \$49.95 (visited May 18, 2005) <http://www.sprint.com/business/products/products/sprintPCSWI-FIAccess_tabB.jsp>.

⁵³³ Ryan Naraine, *Verizon Plans to 'Wi-Fi' Pay Phones*, 802.11 Planet <<http://www.80211-planet.com/news/article.php/2204901>>.

⁵³⁴ *Verizon Wireless Answers the Mayor's Call: Accelerates Expansion of Wireless Broadband Network in New York City and Metro Region*, Press Release, Verizon Wireless, Apr. 27, 2005 (visited May 18, 2005) <<http://news.vzw.com/news/2005/04/pr2005-04-27a.html>>.

⁵³⁵ See Section, Section VI.B.1, Subscriber Growth, *supra*.

second half of 2004, an increase of more than an hour from a year earlier and more than triple the average usage of mobile subscribers in Western Europe and Japan.⁵³⁶ Moreover, although U.S. mobile subscribers still prefer to use their mobile phones to talk rather than to send text messages, SMS traffic volume grew to 4.66 billion per month in December 2004, more than double the 2 billion messages per month reported in December 2003.⁵³⁷ Relatively low prices on mobile voice and data services appear to have been a key factor stimulating subscriber growth and usage. While only two of three different indicators of mobile pricing showed a continued decline in the cost of mobile service in 2004,⁵³⁸ mobile telephone service in the United States remains relatively inexpensive on a per minute basis compared with that in Western Europe.⁵³⁹

205. In addition to the indicators of mobile market performance cited in the preceding paragraph, a wide variety of indicators of carrier conduct and market structure also show that competition in mobile telecommunications markets is robust. For example, mobile telephone providers continued to build out their networks and expand service availability during 2004.⁵⁴⁰ Carriers also continued to deploy networks based on CDMA2000 1xEV-DO or WCDMA technologies that allow them to offer mobile Internet access services for mobile telephone handsets, PDAs, and laptops at speeds comparable to what many users get from fixed broadband connections such as DSL. With respect to market structure, the merger of Cingular Wireless and AT&T Wireless has resulted in the first decline in the number of nationwide carriers since the Commission started compiling these reports.⁵⁴¹ Due largely to this transaction, there was a sharp decline in the percentage of the U.S. population living in counties with access to six or more different mobile telephone operators as compared with the previous year. Nevertheless, despite the reduction in the number of nationwide carriers from six to five, 97 percent of the total U.S. population continues to live in counties where three or more different operators compete to offer mobile telephone service in some parts of those counties, while 93 percent of the U.S. population continues to live in counties with four or more mobile telephone operators competing to offer service, and 87 percent of the U.S. population continues to live in counties with five or more competing mobile telephone operators.⁵⁴²

206. In addition, while relatively few wireless customers have “cut the cord” in the sense of canceling their subscription to wireline telephone service, consumers appear increasingly to chose wireless service over traditional wireline service, particularly for certain uses. A recent study showed that one-third of all households receive more than half of their calls on wireless phones, with 9 percent receiving almost all their calls wirelessly.

207. Using the various data sources and metrics discussed above, we have met our statutory requirement to analyze the competitive market conditions with respect to commercial mobile services,⁵⁴³

⁵³⁶ See Section VI.D.2, Minutes of Use, *supra*, and VI.E, International Comparisons, *supra*.

⁵³⁷ See Section VI.B.1, Subscriber Growth, *supra*, and Section VI.B.3, Mobile Data Usage, *supra*.

⁵³⁸ See Section VI.A.1, Pricing Trends, *supra*.

⁵³⁹ See Section VI.E, International Comparisons, *supra*.

⁵⁴⁰ See Section IV.B.1, Technology Deployment and Upgrades, *supra*.

⁵⁴¹ As noted earlier, the Sprint-Nextel and Alltel-Western Wireless mergers closed too recently for their effects to be reflected in the indicators of market structure, carrier conduct, and market performance. The structural changes resulting from these transactions, and their potential impact on carrier conduct and market performance, will be reflected in future reports.

⁵⁴² See Appendix A, Table 9, *infra*.

⁵⁴³ See Section II.A, Background, *supra*.

and conclude that the CMRS marketplace is effectively competitive.

IX. ADMINISTRATIVE MATTERS

208. This Tenth Report is issued pursuant to authority contained in Section 332 (c)(1)(C) of the Communications Act of 1934, as amended, 47 U.S.C. § 322 (c)(1)(C).

209. It is ORDERED that the Secretary shall send copies of this Report to the appropriate committees and subcommittees of the United States House of Representatives and the United States Senate.

210. It is FURTHER ORDERED that the proceeding in the WT Docket No. 05-71 IS TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A**Mobile Telephony****Table of Contents**

| | |
|---|----|
| Table 1: CTIA's Semi-Annual Mobile Telephone Industry Survey | 79 |
| Table 2: FCC's Semi-Annual Local Telephone Competition Survey | 80 |
| Table 3: Economic Area Penetration Rates | 81 |
| Table 4: Top 25 Mobile Telephone Operators by Subscribers | 85 |
| Table 5: Estimated Mobile Telephone Rollouts by County | 86 |
| Table 6: Mobile Telephone Digital Coverage | 87 |
| Table 7: Change in CPI | 87 |
| Table 8: Average Revenue Per Minute..... | 88 |
| Table 9: Market Entry Over Time | 88 |
| Table 10: Mobile Market Structure and Performance in Selected Countries | 89 |

Table 1: CTIA's Semi-Annual Mobile Telephone Industry Survey

| Date | Estimated Subscribers | Year End over Year End Subscriber Increase | Total Six-Month Service Revenues (000s) | Roamer Services Revenues | Cell Sites | Employees | Cumulative Capital Investment (000s) | Average Local Monthly Bill |
|---------|--------------------------|--|---|--------------------------------|------------|-----------|--|-------------------------------|
| Jan 85 | 91,600 | | \$178,085 | | 346 | 1,404 | \$354,760 | |
| June 85 | 203,600 | | \$176,231 | | 599 | 1,697 | \$588,751 | |
| Dec 85 | 340,213 | 248,613 | \$306,197 | | 913 | 2,727 | \$911,167 | |
| June 86 | 500,000 | | \$360,585 | | 1,194 | 3,556 | \$1,140,163 | |
| Dec 86 | 681,825 | 341,612 | \$462,467 | | 1,531 | 4,334 | \$1,436,753 | |
| June 87 | 883,778 | | \$479,514 | | 1,732 | 5,656 | \$1,724,348 | |
| Dec 87 | 1,230,855 | 549,030 | \$672,005 | | 2,305 | 7,147 | \$2,234,635 | \$96.83 |
| June 88 | 1,608,697 | | \$886,075 | | 2,789 | 9,154 | \$2,589,589 | \$95.00 |
| Dec 88 | 2,069,441 | 838,586 | \$1,073,473 | \$89,331 | 3,209 | 11,400 | \$3,274,105 | \$98.02 |
| June 89 | 2,691,793 | | \$1,406,463 | \$121,368 | 3,577 | 13,719 | \$3,675,473 | \$85.52 |
| Dec 89 | 3,508,944 | 1,439,503 | \$1,934,132 | \$173,199 | 4,169 | 15,927 | \$4,480,141 | \$83.94 |
| June 90 | 4,368,686 | | \$2,126,362 | \$192,350 | 4,768 | 18,973 | \$5,211,765 | \$83.94 |
| Dec 90 | 5,283,055 | 1,774,111 | \$2,422,458 | \$263,660 | 5,616 | 21,382 | \$6,281,596 | \$80.90 |
| June 91 | 6,380,053 | | \$2,653,505 | \$302,329 | 6,685 | 25,545 | \$7,429,739 | \$74.56 |
| Dec 91 | 7,557,148 | 2,274,093 | \$3,055,017 | \$401,325 | 7,847 | 26,327 | \$8,671,544 | \$72.74 |
| June 92 | 8,892,535 | | \$3,633,285 | \$436,725 | 8,901 | 30,595 | \$9,276,139 | \$68.51 |
| Dec 92 | 11,032,753 | 3,475,605 | \$4,189,441 | \$537,146 | 10,307 | 34,348 | \$11,262,070 | \$68.68 |
| June 93 | 13,067,318 | | \$4,819,259 | \$587,347 | 11,551 | 36,501 | \$12,775,967 | \$67.31 |
| Dec 93 | 16,009,461 | 4,976,708 | \$6,072,906 | \$774,266 | 12,805 | 39,775 | \$13,946,406 | \$61.48 |
| June 94 | 19,283,306 | | \$6,519,030 | \$778,116 | 14,740 | 45,606 | \$16,107,920 | \$58.65 |
| Dec 94 | 24,134,421 | 8,124,960 | \$7,710,890 | \$1,052,666 | 17,920 | 53,902 | \$18,938,677 | \$56.21 |
| June 95 | 28,154,415 | | \$8,740,352 | \$1,120,337 | 19,833 | 60,624 | \$21,709,286 | \$52.45 |
| Dec 95 | 33,785,661 | 9,651,240 | \$10,331,614 | \$1,422,233 | 22,663 | 68,165 | \$24,080,466 | \$51.00 |
| June 96 | 38,195,466 | | \$11,194,247 | \$1,314,943 | 24,802 | 73,365 | \$26,707,046 | \$48.84 |
| Dec 96 | 44,042,992 | 10,257,331 | \$12,440,724 | \$1,465,992 | 30,045 | 84,161 | \$32,573,522 | \$47.70 |
| June 97 | 48,705,553 | | \$13,134,551 | \$1,392,440 | 38,650 | 97,039 | \$37,454,294 | \$43.86 |
| Dec 97 | 55,312,293 | 11,269,301 | \$14,351,082 | \$1,581,765 | 51,600 | 109,387 | \$46,057,911 | \$42.78 |
| June 98 | 60,831,431 | | \$15,286,660 | \$1,584,891 | 57,674 | 113,111 | \$50,178,812 | \$39.88 |
| Dec 98 | 69,209,321 | 13,897,028 | \$17,846,515 | \$1,915,578 | 65,887 | 134,754 | \$60,542,774 | \$39.43 |
| June 99 | 76,284,753 | | \$19,368,304 | \$1,922,416 | 74,157 | 141,929 | \$66,782,827 | \$40.24 |
| Dec 99 | 86,047,003 | 16,837,682 | \$20,650,185 | \$2,163,001 | 81,698 | 155,817 | \$71,264,865 | \$41.24 |
| June 00 | 97,035,925 | | \$24,645,365 | \$1,971,625 | 95,733 | 159,645 | \$76,652,358 | \$45.15 |
| Dec 00 | 109,478,031 | 23,431,028 | \$27,820,655 | \$1,911,356 | 104,288 | 184,449 | \$89,624,387 | \$45.27 |
| June 01 | 118,397,734 | | \$30,905,721 | \$1,727,058 | 114,059 | 186,317 | \$99,728,965 | \$45.56 |
| Dec 01 | 128,374,512 | 18,896,481 | \$34,110,163 | \$2,209,387 | 127,540 | 203,580 | \$105,030,101 | \$47.37 |
| June 02 | 134,561,370 | | \$36,707,086 | \$1,846,267 | 131,350 | 186,956 | \$118,418,677 | \$47.42 |
| Dec 02 | 140,766,842 | 12,392,330 | \$39,801,101 | \$2,049,245 | 139,338 | 192,410 | \$126,922,347 | \$48.40 |
| June 03 | 148,065,824 | | \$41,384,171 | \$1,825,243 | 147,719 | 187,169 | \$134,147,049 | \$49.46 |
| Dec 03 | 158,721,981 | 17,955,139 | \$46,239,922 | \$1,941,024 | 162,986 | 205,629 | \$145,866,914 | \$49.91 |
| June 04 | 169,467,393 | | \$49,275,671 | \$2,015,780 | 174,368 | 212,186 | \$156,700,380 | \$49.49 |
| Dec 04 | 182,140,362 | 23,418,381 | \$52,854,539 | \$2,194,532 | 175,725 | 226,016 | \$173,793,507 | \$50.64 |

Source: CTIA, *Background on CTIA's Semi-Annual Wireless Industry Survey*<http://www.ctia.org/research_statistics/statistics/index.cfm/AID/10030>.

Table 2: FCC's Semi-Annual Local Telephone Competition Survey

| State | December 2004 | | Subscribers | | | | | | | | | | | | Percent Change Dec 03 - Dec 04 |
|-------------------|-----------------------|-----------------------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------|--------------------------------|
| | Carriers ¹ | Percent Resold ² | | | | | | | | | | | | | |
| | | | 1999 | 2000 | | 2001 | | 2002 | | 2003 | | 2004 | | | |
| | | | Dec | Jun | Dec | Jun | Dec | Jun | Dec | Jun | Dec | Jun | Dec | | |
| Alabama | 10 | 9 % | 1,080,410 | 1,253,084 | 1,386,294 | 1,930,631 | 1,979,075 | 2,027,845 | 1,987,254 | 2,100,557 | 2,242,108 | 2,301,847 | 2,580,810 | 15 % | |
| Alaska | 4 | 6 | 165,221 | 169,892 | * | 218,424 | 240,216 | 242,133 | 267,630 | * | 303,184 | 307,323 | 321,152 | 6 | |
| American Samoa | * | * | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | NA | |
| Arizona | 12 | 11 | 1,125,321 | 1,624,668 | 1,855,115 | 2,018,410 | 2,171,021 | 2,412,998 | 2,520,058 | 2,643,952 | 2,843,061 | 3,079,657 | 3,299,222 | 16 | |
| Arkansas | 6 | 5 | 719,919 | 715,467 | 743,928 | 891,275 | 970,127 | 1,130,302 | 1,156,345 | 1,351,291 | 1,296,901 | 1,376,564 | 1,458,673 | 12 | |
| California | 13 | 8 | 8,544,941 | 12,283,369 | 12,710,520 | 14,184,625 | 15,052,203 | 16,007,376 | 17,575,105 | 18,892,619 | 20,360,454 | 21,575,797 | 23,457,761 | 15 | |
| Colorado | 9 | 7 | 1,552,718 | 1,654,989 | 1,856,075 | 1,983,405 | 2,145,816 | 2,247,166 | 2,358,748 | 2,426,929 | 2,554,731 | 2,727,910 | 2,808,195 | 10 | |
| Connecticut | 5 | 4 | 1,077,089 | 1,136,618 | 1,277,123 | 1,418,367 | 1,639,914 | 1,577,873 | 1,694,110 | 1,791,944 | 1,928,988 | 2,064,204 | 2,181,133 | 13 | |
| Delaware | 5 | 5 | 270,848 | 275,219 | 371,014 | 389,284 | 412,611 | 433,059 | 438,196 | 503,353 | 543,526 | 593,452 | 646,064 | 19 | |
| Dist. of Columbia | 5 | 9 | 346,681 | 333,815 | 354,735 | 382,457 | 404,489 | 415,399 | 472,832 | 520,182 | 513,102 | 555,958 | 657,774 | 28 | |
| Florida | 8 | 15 | 5,158,079 | 4,983,478 | 6,369,985 | 7,536,670 | 8,937,063 | 8,607,715 | 9,482,349 | 10,252,348 | 10,855,430 | 11,916,615 | 13,169,278 | 21 | |
| Georgia | 12 | 8 | 2,538,983 | 2,687,238 | 2,754,784 | 4,076,119 | 4,149,717 | 4,300,831 | 4,497,576 | 4,709,288 | 4,940,091 | 5,332,517 | 5,730,223 | 16 | |
| Guam | * | * | * | * | 0 | * | * | * | * | * | * | * | * | NA | |
| Hawaii | 5 | 1 | 288,425 | 454,364 | 524,291 | 543,283 | 595,721 | 640,247 | 689,857 | 732,262 | 771,023 | 819,262 | 880,965 | 14 | |
| Idaho | 9 | 14 | 271,436 | 296,066 | 344,564 | 398,781 | 444,864 | 500,693 | 536,064 | 572,406 | 605,488 | 653,779 | 705,948 | 17 | |
| Illinois | 9 | 7 | 3,922,482 | 4,309,660 | 5,143,767 | 5,621,044 | 5,631,172 | 5,409,370 | 6,476,683 | 6,834,217 | 7,183,989 | 7,529,966 | 8,075,938 | 12 | |
| Indiana | 7 | 13 | 1,318,975 | 1,717,378 | 1,715,074 | 1,781,247 | 1,921,356 | 2,032,290 | 2,390,567 | 2,456,509 | 2,642,810 | 2,844,568 | 3,158,002 | 19 | |
| Iowa | 10 | 10 | 774,773 | 975,629 | 832,106 | 861,382 | 1,087,608 | 1,157,580 | 1,239,384 | 1,250,305 | 1,342,931 | 1,445,711 | 1,557,542 | 16 | |
| Kansas | 11 | 6 | 669,472 | 724,024 | 801,293 | 901,225 | 956,050 | 1,061,171 | 1,117,277 | 1,195,230 | 1,261,242 | 1,345,160 | 1,454,087 | 15 | |
| Kentucky | 10 | 10 | 911,700 | 999,544 | 1,026,334 | 1,176,756 | 1,405,043 | 1,505,982 | 1,456,705 | 1,595,290 | 1,812,657 | 2,000,459 | 2,189,345 | 21 | |
| Louisiana | 8 | 14 | 1,227,106 | 1,294,693 | 1,306,457 | 1,677,292 | 1,920,740 | 2,187,811 | 2,190,613 | 2,365,224 | 2,470,146 | 2,547,153 | 2,834,716 | 15 | |
| Maine | 6 | 2 | 187,003 | 283,640 | 359,786 | 399,616 | 427,313 | 457,835 | 466,896 | 524,246 | 568,159 | 610,533 | 662,623 | 17 | |
| Maryland | 7 | 7 | 1,634,625 | 2,013,058 | 2,298,651 | 2,446,818 | 2,614,216 | 2,684,441 | 2,913,943 | 3,108,086 | 3,319,695 | 3,575,747 | 3,900,172 | 17 | |
| Massachusetts | 5 | 5 | 1,892,014 | 2,228,169 | 2,649,130 | 2,753,685 | 2,996,816 | 3,289,934 | 3,375,726 | 3,506,039 | 3,741,975 | 3,919,139 | 4,042,592 | 8 | |
| Michigan | 11 | 8 | 3,512,813 | 3,423,535 | 3,551,719 | 4,071,091 | 4,238,399 | 4,758,538 | 4,674,980 | 4,889,269 | 5,114,259 | 5,430,637 | 5,766,616 | 13 | |
| Minnesota | 10 | 13 | 1,550,411 | 1,595,560 | 1,851,430 | 2,014,317 | 2,153,857 | 2,254,895 | 2,415,033 | 2,564,783 | 2,677,472 | 2,823,079 | 2,973,126 | 11 | |
| Mississippi | 8 | 13 | 673,355 | 509,038 | 786,577 | 993,781 | 1,048,061 | 1,106,700 | 1,112,765 | 1,232,750 | 1,324,160 | 1,411,277 | 1,517,702 | 15 | |
| Missouri | 10 | 8 | 1,855,452 | 1,848,775 | 1,767,411 | 1,937,684 | 2,106,599 | 2,246,430 | 2,289,831 | 2,515,325 | 2,691,255 | 2,859,953 | 3,109,167 | 16 | |
| Montana | * | * | * | * | * | * | 279,349 | 291,429 | 315,512 | 343,160 | 373,947 | * | * | NA | |
| Nebraska | 8 | 5 | 576,296 | 600,885 | 659,380 | 712,685 | 791,799 | 838,568 | 867,810 | 900,744 | 937,184 | 984,355 | 1,045,810 | 12 | |
| Nevada | 7 | 10 | 750,335 | 825,163 | 684,752 | 766,581 | 842,155 | 895,586 | 984,486 | 1,077,380 | 1,216,838 | 1,319,684 | 1,463,370 | 20 | |
| New Hampshire | 7 | 11 | 280,508 | 309,263 | 387,264 | 445,181 | 492,390 | 529,795 | 525,689 | 598,504 | 648,788 | 686,746 | 727,985 | 12 | |
| New Jersey | 5 | 4 | 2,289,181 | 2,750,024 | 3,575,130 | 3,896,778 | 4,283,643 | 4,531,457 | 4,587,640 | 5,392,240 | 5,799,417 | 6,326,459 | 7,388,722 | 27 | |
| New Mexico | 9 | 17 | 363,827 | 395,111 | 443,343 | 619,582 | 660,849 | 735,107 | 780,855 | 828,869 | 859,408 | 939,091 | 987,813 | 15 | |
| New York | 9 | 7 | 4,833,816 | 5,016,524 | 5,918,136 | 6,749,096 | 7,429,249 | 7,915,526 | 8,937,683 | 8,829,070 | 9,453,613 | 9,939,759 | 10,834,741 | 15 | |
| North Carolina | 11 | 9 | 2,536,068 | 2,730,178 | 3,105,811 | 3,377,331 | 3,767,598 | 4,610,120 | 4,094,715 | 4,305,521 | 4,554,723 | 4,875,916 | 5,363,630 | 18 | |
| North Dakota | 4 | 15 | * | * | * | * | * | 245,578 | * | * | * | * | 373,445 | NA | |
| Ohio | 12 | 7 | 3,237,786 | 3,278,960 | 4,150,498 | 4,255,934 | 4,739,795 | 4,887,376 | 5,212,204 | 5,659,459 | 5,817,211 | 6,188,081 | 6,627,910 | 14 | |
| Oklahoma | 12 | 6 | 826,637 | 979,513 | 1,124,214 | 1,200,234 | 1,288,357 | 1,366,475 | 1,440,970 | 1,574,588 | 1,614,191 | 1,724,505 | 1,760,122 | 9 | |
| Oregon | 9 | 5 | 914,848 | 1,082,425 | 1,201,207 | 1,268,909 | 1,399,279 | 1,473,883 | 1,682,343 | 1,682,036 | 1,778,936 | 1,894,285 | 2,029,224 | 14 | |
| Pennsylvania | 9 | 8 | 2,767,474 | 3,850,372 | 4,129,186 | 4,378,216 | 4,849,085 | 4,987,067 | 5,258,844 | 5,681,653 | 6,073,573 | 6,420,037 | 7,037,296 | 16 | |
| Puerto Rico | 6 | 7 | * | 1,090,005 | 757,613 | 1,374,747 | 1,128,736 | 1,136,619 | 1,516,808 | 1,401,599 | 1,631,266 | 1,698,702 | 2,076,698 | 27 | |
| Rhode Island | 5 | 5 | 279,304 | 313,550 | 355,889 | 401,805 | 456,059 | 463,636 | 515,547 | 527,366 | 567,331 | 615,398 | 607,489 | 7 | |
| South Carolina | 11 | 15 | 1,137,232 | 1,236,338 | 1,392,586 | 1,502,345 | 1,752,457 | 1,830,516 | 1,896,369 | 2,041,541 | 2,149,480 | 2,337,367 | 2,369,252 | 10 | |
| South Dakota | 5 | 11 | * | * | * | * | 278,646 | 292,210 | 325,114 | 344,825 | 365,211 | 382,906 | 428,513 | 17 | |
| Tennessee | 12 | 9 | 1,529,054 | 1,876,444 | 1,985,851 | 2,251,208 | 2,510,978 | 2,660,068 | 2,674,565 | 2,800,735 | 2,974,512 | 3,171,487 | 3,531,286 | 19 | |
| Texas | 18 | 9 | 5,792,453 | 6,705,423 | 7,548,537 | 8,294,338 | 9,156,187 | 9,650,715 | 10,133,280 | 10,776,234 | 11,327,700 | 12,091,134 | 13,092,007 | 16 | |
| Utah | 8 | 9 | 643,824 | 692,006 | 750,244 | 833,492 | 919,002 | 970,854 | 1,052,522 | 1,094,563 | 1,154,992 | 1,229,029 | 1,345,205 | 16 | |
| Vermont | * | * | * | * | * | * | * | * | * | * | * | * | * | NA | |
| Virgin Islands | * | * | * | 0 | 0 | * | * | * | * | * | * | * | * | NA | |
| Virginia | 9 | 4 | 2,262,567 | 2,447,687 | 2,708,342 | 3,059,420 | 3,270,165 | 3,429,450 | 3,753,106 | 3,879,582 | 4,147,182 | 4,392,319 | 4,240,462 | 2 | |
| Washington | 8 | 11 | 1,873,475 | 2,144,767 | 2,286,082 | 2,493,214 | 2,706,030 | 2,849,043 | 2,869,784 | 3,102,750 | 3,377,193 | 3,567,896 | 3,770,602 | 12 | |
| West Virginia | 9 | 10 | 241,265 | 347,916 | 392,384 | 452,036 | 498,811 | 549,722 | 576,503 | 579,983 | 675,257 | 713,657 | 761,658 | 13 | |
| Wisconsin | 11 | 8 | 1,525,818 | 1,342,908 | 1,698,520 | 2,008,679 | 2,229,389 | 2,523,956 | 2,396,562 | 2,533,215 | 2,723,985 | 2,831,645 | 2,997,029 | 10 | |
| Wyoming | 4 | 5 | 127,634 | * | * | 173,939 | 194,665 | 168,232 | 191,939 | 276,344 | 295,706 | 277,658 | 302,203 | 2 | |
| Nationwide | 76 | 9 % | 79,696,083 | 90,643,058 | 101,043,219 | 114,028,928 | 123,990,857 | 130,751,459 | 138,878,293 | 147,623,734 | 157,042,082 | 167,313,001 | 181,105,135 | 15 % | |

NA – Not Applicable

* Data withheld to maintain firm confidentiality.

1/ Carriers with under 10,000 subscribers in a state were not required to report for that state.

2/ Percentage of mobile wireless subscribers receiving their service from a mobile wireless reseller.

Source: Local Telephone Competition: Status as of December 31, 2004, Federal Communications Commission, July 2005 (Table 13: Mobile Wireless Telephone Subscribers).

Table 3: Economic Area Penetration Rates

| EA | EA Name | Subscribers | EA Population | 2004 Penetration Rate | 2004 HHI | 2003 Penetration Rate | EA density |
|-----|--|-------------|---------------|-----------------------|----------|-----------------------|------------|
| 40 | Atlanta, GA-AL-NC | 4,399,986 | 5,471,412 | 80% | 2096 | 69.94% | 246.04 |
| 13 | Washington-Baltimore, DC-MD-VA-WV-PA | 6,600,891 | 8,403,130 | 79% | 2283 | 66.31% | 402.76 |
| 32 | Fort Myers-Cape Coral, FL | 537,603 | 692,265 | 78% | 1799 | 65.91% | 234.27 |
| 161 | San Diego, CA | 2,189,741 | 2,813,833 | 78% | 2486 | 68.34% | 660.48 |
| 81 | Pensacola, FL | 478,740 | 623,252 | 77% | 1744 | 61.33% | 154.06 |
| 153 | Las Vegas, NV-AZ-UT | 1,307,988 | 1,709,797 | 77% | 2155 | 62.18% | 23.74 |
| 130 | Austin-San Marcos, TX | 1,020,472 | 1,349,267 | 76% | 2440 | 65.22% | 156.06 |
| 29 | Jacksonville, FL-GA | 1,411,557 | 1,885,190 | 75% | 1797 | 62.25% | 112.52 |
| 30 | Orlando, FL | 2,690,742 | 3,642,540 | 74% | 2288 | 59.32% | 265.84 |
| 31 | Miami-Fort Lauderdale, FL | 4,169,125 | 5,602,222 | 74% | 2080 | 64.19% | 483.20 |
| 172 | Honolulu, HI | 896,643 | 1,211,537 | 74% | 2200 | 65.23% | 187.20 |
| 34 | Tampa-St. Petersburg-Clearwater, FL | 1,718,969 | 2,395,997 | 72% | 1727 | 59.30% | 890.99 |
| 74 | Huntsville, AL-TN | 710,709 | 997,824 | 71% | 2560 | 56.73% | 119.14 |
| 78 | Birmingham, AL | 1,121,667 | 1,578,903 | 71% | 2265 | 59.22% | 137.13 |
| 141 | Denver-Boulder-Greeley, CO-KS-NE | 2,820,176 | 3,984,105 | 71% | 2025 | 63.02% | 52.02 |
| 57 | Detroit-Ann Arbor-Flint, MI | 4,847,876 | 6,963,637 | 70% | 2118 | 61.71% | 364.07 |
| 131 | Houston-Galveston-Brazoria, TX | 3,916,762 | 5,632,853 | 70% | 2313 | 61.07% | 169.25 |
| 160 | Los Angeles-Riverside-Orange County, CA-AZ | 12,682,749 | 18,003,420 | 70% | 2433 | 61.22% | 286.10 |
| 10 | New York-No. New Jer.-Long Island, NY-NJ-CT-PA-MA-VT | 17,679,758 | 25,712,577 | 69% | 2326 | 59.46% | 890.56 |
| 12 | Philadelphia-Wilmington-Atl. City, PA-NJ-DE-MD | 5,066,628 | 7,309,792 | 69% | 2409 | 59.60% | 778.84 |
| 19 | Raleigh-Durham-Chapel Hill, NC | 1,255,088 | 1,831,510 | 69% | 1865 | 59.35% | 188.38 |
| 39 | Columbus, GA-AL | 343,102 | 496,538 | 69% | 1669 | 54.98% | 84.08 |
| 163 | San Francisco-Oakland-San Jose, CA | 6,328,740 | 9,111,806 | 69% | 2598 | 62.83% | 271.07 |
| 170 | Seattle-Tacoma-Bremerton, WA | 2,845,745 | 4,135,291 | 69% | 2336 | 60.65% | 190.45 |
| 23 | Charlotte-Gastonia-Rock Hill, NC-SC | 1,380,459 | 2,031,519 | 68% | 2019 | 60.25% | 240.50 |
| 26 | Charleston-North Charleston, SC | 402,224 | 587,297 | 68% | 1908 | 61.90% | 149.80 |
| 79 | Montgomery, AL | 326,555 | 481,137 | 68% | 1724 | 58.56% | 66.86 |
| 158 | Phoenix-Mesa, AZ-NM | 2,322,685 | 3,407,197 | 68% | 1807 | 58.49% | 93.91 |
| 164 | Sacramento-Yolo, CA | 1,579,733 | 2,311,567 | 68% | 2545 | 61.61% | 188.08 |
| 3 | Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT | 5,318,293 | 7,954,554 | 67% | 2319 | 56.95% | 421.83 |
| 33 | Sarasota-Bradenton, FL | 510,392 | 763,795 | 67% | 1863 | 54.54% | 273.56 |
| 70 | Louisville, KY-IN | 943,702 | 1,416,914 | 67% | 2233 | 54.65% | 180.92 |
| 103 | Cedar Rapids, IA | 256,339 | 384,577 | 67% | 2826 | 60.50% | 101.33 |
| 15 | Richmond-Petersburg, VA | 953,153 | 1,446,123 | 66% | 1895 | 57.48% | 124.03 |
| 20 | Norfolk-Virginia Beach-Newport News, VA-NC | 1,142,954 | 1,722,764 | 66% | 1712 | 59.00% | 289.89 |
| 99 | Kansas City, MO-KS | 1,631,707 | 2,469,340 | 66% | 1954 | 57.38% | 88.73 |
| 127 | Dallas-Fort Worth, TX-AR-OK | 5,068,892 | 7,645,530 | 66% | 2708 | 57.15% | 119.00 |
| 35 | Tallahassee, FL-GA | 470,295 | 720,434 | 65% | 2105 | 57.29% | 63.51 |
| 64 | Chicago-Gary-Kenosha, IL-IN-WI | 6,747,713 | 10,328,854 | 65% | 1884 | 57.63% | 556.54 |
| 71 | Nashville, TN-KY | 1,567,076 | 2,444,643 | 64% | 2212 | 54.18% | 105.12 |
| 107 | Minneapolis-St. Paul, MN-WI-IA | 2,887,659 | 4,498,286 | 64% | 1554 | 56.07% | 82.98 |
| 134 | San Antonio, TX | 1,363,432 | 2,141,060 | 64% | 2687 | 53.76% | 82.99 |
| 151 | Reno, NV-CA | 428,904 | 670,013 | 64% | 2115 | 53.90% | 7.56 |
| 24 | Columbia, SC | 583,258 | 932,115 | 63% | 2170 | 56.63% | 125.95 |
| 73 | Memphis, TN-AR-MS-KY | 1,178,159 | 1,882,332 | 63% | 2395 | 53.62% | 102.99 |
| 80 | Mobile, AL | 425,052 | 676,258 | 63% | 2431 | 53.04% | 74.75 |

| EA | EA Name | Subscribers | EA Population | 2004 Penetration Rate | 2004 HHI | 2003 Penetration Rate | EA density |
|-----|--|-------------|---------------|-----------------------|----------|-----------------------|------------|
| 82 | Biloxi-Gulfport-Pascagoula, MS | 251,602 | 396,754 | 63% | 1844 | 53.75% | 143.45 |
| 83 | New Orleans, LA-MS | 1,085,200 | 1,725,338 | 63% | 2570 | 55.47% | 171.93 |
| 84 | Baton Rouge, LA-MS | 467,751 | 739,673 | 63% | 4103 | 55.27% | 140.30 |
| 98 | Columbia, MO | 231,264 | 369,014 | 63% | 3565 | 55.71% | 58.00 |
| 148 | Idaho Falls, ID-WY | 192,820 | 306,120 | 63% | 2540 | 55.56% | 10.85 |
| 167 | Portland-Salem, OR-WA | 1,826,079 | 2,883,737 | 63% | 2251 | 55.36% | 76.01 |
| 22 | Fayetteville, NC | 325,395 | 528,224 | 62% | 1880 | 53.39% | 164.57 |
| 42 | Asheville, NC | 277,559 | 444,594 | 62% | 3609 | 55.53% | 128.63 |
| 44 | Knoxville, TN | 612,077 | 983,329 | 62% | 2266 | 53.35% | 165.64 |
| 49 | Cincinnati-Hamilton, OH-KY-IN | 1,346,650 | 2,184,860 | 62% | 2136 | 55.45% | 294.08 |
| 97 | Springfield, IL-MO | 319,432 | 517,462 | 62% | 3518 | 54.00% | 58.20 |
| 119 | Lincoln, NE | 234,631 | 379,321 | 62% | 3819 | 56.68% | 50.24 |
| 159 | Tucson, AZ | 619,700 | 999,882 | 62% | 1741 | 54.32% | 60.03 |
| 11 | Harrisburg-Lebanon-Carlisle, PA | 684,542 | 1,125,265 | 61% | 2906 | 52.43% | 292.42 |
| 41 | Greenville-Spartanburg-Anderson, SC-NC | 766,407 | 1,248,824 | 61% | 2731 | 54.12% | 183.62 |
| 51 | Columbus, OH | 1,443,359 | 2,349,060 | 61% | 2279 | 52.99% | 190.40 |
| 63 | Milwaukee-Racine, WI | 1,364,308 | 2,255,183 | 61% | 2339 | 54.37% | 366.88 |
| 96 | St. Louis, MO-IL | 2,175,046 | 3,558,651 | 61% | 2613 | 53.89% | 127.01 |
| 106 | Rochester, MN-IA-WI | 193,151 | 318,374 | 61% | 3176 | 54.62% | 55.65 |
| 125 | Oklahoma City, OK | 1,034,482 | 1,698,197 | 61% | 3714 | 41.90% | 65.04 |
| 143 | Casper, WY-ID-UT | 247,762 | 408,708 | 61% | 4378 | 53.74% | 5.17 |
| 150 | Boise City, ID-OR | 349,835 | 574,876 | 61% | 2391 | 52.95% | 13.69 |
| 152 | Salt Lake City-Ogden, UT-ID | 1,267,573 | 2,088,974 | 61% | 2137 | 52.91% | 35.68 |
| 25 | Wilmington, NC-SC | 523,937 | 878,267 | 60% | 1828 | 53.28% | 107.39 |
| 28 | Savannah, GA-SC | 399,420 | 668,214 | 60% | 1760 | 58.73% | 91.95 |
| 43 | Chattanooga, TN-GA | 432,342 | 720,375 | 60% | 2476 | 51.54% | 145.32 |
| 85 | Lafayette, LA | 363,382 | 601,654 | 60% | 4003 | 52.27% | 99.99 |
| 90 | Little Rock-North Little Rock, AR | 960,972 | 1,614,850 | 60% | 3968 | 53.70% | 46.09 |
| 111 | Minot, ND | 66,357 | 111,195 | 60% | 3465 | * | 7.00 |
| 118 | Omaha, NE-IA-MO | 628,799 | 1,044,156 | 60% | 1985 | 54.63% | 62.40 |
| 137 | Lubbock, TX | 223,809 | 374,626 | 60% | 2669 | 52.16% | 27.17 |
| 156 | Albuquerque, NM-AZ | 550,868 | 921,086 | 60% | 2012 | 53.41% | 20.89 |
| 50 | Dayton-Springfield, OH | 665,914 | 1,133,004 | 59% | 2354 | 53.67% | 318.52 |
| 89 | Monroe, LA | 196,091 | 333,519 | 59% | 4044 | 51.46% | 56.12 |
| 92 | Fayetteville-Springdale-Rogers, AR-MO-OK | 238,069 | 405,160 | 59% | 3685 | 52.01% | 88.43 |
| 124 | Tulsa, OK-KS | 822,803 | 1,384,426 | 59% | 2777 | 52.59% | 72.44 |
| 155 | Farmington, NM-CO | 115,064 | 193,872 | 59% | 4516 | 50.11% | 16.04 |
| 2 | Portland, ME | 430,714 | 748,817 | 58% | 2614 | 49.50% | 98.56 |
| 18 | Greensboro-Winston-Salem-High Point, NC-VA | 1,080,786 | 1,854,853 | 58% | 1829 | 49.73% | 189.09 |
| 36 | Dothan, AL-FL-GA | 191,359 | 332,409 | 58% | 2225 | 44.82% | 53.70 |
| 37 | Albany, GA | 272,343 | 468,178 | 58% | 2540 | 46.98% | 62.74 |
| 67 | Indianapolis, IN-IL | 1,772,015 | 3,066,469 | 58% | 2721 | 50.49% | 171.37 |
| 116 | Sioux Falls, SD-IA-MN-NE | 298,792 | 519,143 | 58% | 3567 | 50.96% | 15.11 |
| 149 | Twin Falls, ID | 94,154 | 162,397 | 58% | 2429 | 52.02% | 14.08 |
| 5 | Albany-Schenectady-Troy, NY | 669,654 | 1,171,669 | 57% | 2740 | 48.19% | 134.71 |
| 16 | Staunton, VA-WV | 191,771 | 334,087 | 57% | 1849 | 50.30% | 50.99 |
| 27 | Augusta-Aiken, GA-SC | 343,622 | 604,799 | 57% | 2004 | 51.51% | 89.79 |
| 53 | Pittsburgh, PA-WV | 1,697,634 | 2,971,829 | 57% | 2649 | 51.06% | 284.77 |

| EA | EA Name | Subscribers | EA Population | 2004 Penetration Rate | 2004 HHI | 2003 Penetration Rate | EA density |
|-----|---------------------------------------|-------------|------------------|-----------------------------|-------------|-----------------------------|---------------|
| 75 | Tupelo, MS-AL-TN | 355,803 | 625,002 | 57% | 4820 | 44.50% | 49.76 |
| 87 | Beaumont-Port Arthur, TX | 262,074 | 456,637 | 57% | 3187 | 50.64% | 89.20 |
| 102 | Davenport-Moline-Rock Island, IA-IL | 319,918 | 558,913 | 57% | 2514 | 50.35% | 108.27 |
| 104 | Madison, WI-IL-IA | 535,325 | 933,823 | 57% | 4237 | 50.55% | 71.33 |
| 121 | North Platte, NE-CO | 34,990 | 61,758 | 57% | 7018 | * | 4.95 |
| 122 | Wichita, KS-OK | 672,152 | 1,175,577 | 57% | 1862 | 48.13% | 20.49 |
| 132 | Corpus Christi, TX | 314,474 | 549,012 | 57% | 2834 | 49.32% | 46.47 |
| 166 | Eugene-Springfield, OR-CA | 448,641 | 791,776 | 57% | 1938 | 49.20% | 43.10 |
| 21 | Greenville, NC | 461,455 | 823,517 | 56% | 2687 | 50.13% | 87.74 |
| 38 | Macon, GA | 428,615 | 768,701 | 56% | 1868 | 45.47% | 62.88 |
| 59 | Green Bay, WI-MI | 375,325 | 671,225 | 56% | 2468 | 49.46% | 34.15 |
| 69 | Evansville-Henderson, IN-KY-IL | 480,475 | 854,714 | 56% | 3851 | 48.72% | 75.31 |
| 77 | Jackson, MS-AL-LA | 798,271 | 1,432,518 | 56% | 2883 | 49.21% | 49.67 |
| 93 | Joplin, MO-KS-OK | 148,544 | 263,904 | 56% | 3133 | 46.96% | 74.68 |
| 94 | Springfield, MO | 477,887 | 859,559 | 56% | 3303 | 48.68% | 48.14 |
| 100 | Des Moines, IA-IL-MO | 949,831 | 1,683,257 | 56% | 3011 | 49.49% | 47.32 |
| 101 | Peoria-Pekin, IL | 298,553 | 528,671 | 56% | 3451 | 50.04% | 90.99 |
| 135 | Odessa-Midland, TX | 218,156 | 388,007 | 56% | 3411 | 49.12% | 10.13 |
| 138 | Amarillo, TX-NM | 268,117 | 481,633 | 56% | 1695 | 48.55% | 11.79 |
| 142 | Scottsbluff, NE-WY | 51,380 | 92,360 | 56% | 7064 | 48.66% | 7.81 |
| 154 | Flagstaff, AZ-UT | 225,848 | 401,766 | 56% | 2809 | 47.81% | 8.24 |
| 62 | Grand Rapids-Muskegon-Holland, MI | 1,031,897 | 1,881,991 | 55% | 2204 | 48.94% | 206.76 |
| 88 | Shreveport-Bossier City, LA-AR | 317,777 | 573,616 | 55% | 3387 | 47.80% | 57.96 |
| 120 | Grand Island, NE | 157,994 | 288,047 | 55% | 6654 | 51.04% | 11.56 |
| 123 | Topeka, KS | 251,297 | 454,539 | 55% | 1760 | 48.76% | 35.62 |
| 144 | Billings, MT-WY | 224,011 | 404,902 | 55% | 4397 | 48.60% | 4.89 |
| 162 | Fresno, CA | 779,419 | 1,419,998 | 55% | 3387 | 48.52% | 98.64 |
| 165 | Redding, CA-OR | 184,102 | 336,820 | 55% | 2031 | 47.68% | 14.36 |
| 14 | Salisbury, MD-DE-VA | 196,676 | 363,970 | 54% | 5693 | 44.44% | 111.17 |
| 45 | Johnson City-Kingsport-Bristol, TN-VA | 309,456 | 576,081 | 54% | 1945 | 48.78% | 144.51 |
| 55 | Cleveland-Akron, OH-PA | 2,552,134 | 4,692,460 | 54% | 2269 | 49.90% | 427.84 |
| 56 | Toledo, OH | 693,046 | 1,294,395 | 54% | 2873 | 48.37% | 163.94 |
| 60 | Appleton-Oshkosh-Neenah, WI | 232,671 | 433,250 | 54% | 2427 | 48.59% | 143.62 |
| 61 | Traverse City, MI | 155,942 | 286,745 | 54% | 4192 | 64.26% | 50.67 |
| 68 | Champaign-Urbana, IL | 342,046 | 630,898 | 54% | 2923 | 47.66% | 73.47 |
| 86 | Lake Charles, LA | 290,027 | 536,758 | 54% | 2680 | 46.34% | 52.41 |
| 113 | Fargo-Moorhead, ND-MN | 201,437 | 371,691 | 54% | 2806 | 49.16% | 16.40 |
| 139 | Santa Fe, NM | 138,946 | 258,790 | 54% | 3014 | 49.07% | 13.06 |
| 147 | Spokane, WA-ID | 448,385 | 829,735 | 54% | 2609 | 47.83% | 23.63 |
| 169 | Richland-Kennewick-Pasco, WA | 363,260 | 677,674 | 54% | 2638 | 46.13% | 27.68 |
| 17 | Roanoke, VA-NC-WV | 441,807 | 826,284 | 53% | 1898 | 47.18% | 97.83 |
| 66 | Fort Wayne, IN | 382,963 | 725,847 | 53% | 3274 | 44.44% | 158.50 |
| 146 | Missoula, MT | 209,597 | 399,183 | 53% | 4762 | 45.89% | 10.79 |
| 7 | Rochester, NY-PA | 776,033 | 1,493,518 | 52% | 3530 | 47.17% | 167.21 |
| 112 | Bismarck, ND-MT-SD | 91,936 | 175,427 | 52% | 5005 | 46.55% | 6.26 |
| 115 | Rapid City, SD-MT-NE-ND | 110,364 | 213,696 | 52% | 4672 | 44.08% | 5.04 |
| 126 | Western Oklahoma, OK | 72,552 | 139,761 | 52% | 2956 | 46.26% | 12.04 |
| 128 | Abilene, TX | 116,223 | 222,147 | 52% | 3095 | 43.07% | 20.35 |

| EA | EA Name | Subscribers | EA Population | 2004 Penetration Rate | 2004 HHI | 2003 Penetration Rate | EA density |
|-----|------------------------------|-------------|---------------|-----------------------|----------|-----------------------|------------|
| 136 | Hobbs, NM-TX | 99,412 | 190,340 | 52% | 3198 | 39.68% | 11.21 |
| 1 | Bangor, ME | 268,257 | 526,106 | 51% | 4862 | 41.79% | 20.94 |
| 6 | Syracuse, NY-PA | 966,484 | 1,902,640 | 51% | 3461 | 42.68% | 104.74 |
| 8 | Buffalo-Niagara Falls, NY-PA | 773,113 | 1,507,759 | 51% | 2597 | 44.76% | 212.89 |
| 46 | Hickory-Morganton, NC-TN | 265,245 | 519,208 | 51% | 2428 | 42.34% | 131.90 |
| 91 | Fort Smith, AR-OK | 166,614 | 329,136 | 51% | 3655 | 45.10% | 46.51 |
| 95 | Jonesboro, AR-MO | 154,723 | 303,852 | 51% | 4657 | 46.07% | 51.30 |
| 171 | Anchorage, AK | 321,147 | 626,932 | 51% | 4436 | 46.30% | 1.07 |
| 65 | Elkhart-Goshen, IN-MI | 465,200 | 936,245 | 50% | 2197 | 42.39% | 185.73 |
| 133 | McAllen-Edinburg-Mission, TX | 490,439 | 978,369 | 50% | 2902 | 40.89% | 221.96 |
| 9 | State College, PA | 392,843 | 809,979 | 49% | 3724 | 41.15% | 92.41 |
| 110 | Grand Forks, ND-MN | 113,930 | 230,253 | 49% | 3973 | 44.30% | 10.16 |
| 140 | Pueblo, CO-NM | 135,990 | 279,600 | 49% | 2385 | 42.03% | 8.71 |
| 157 | El Paso, TX-NM | 472,875 | 955,602 | 49% | 2131 | 40.90% | 33.04 |
| 109 | Duluth-Superior, MN-WI | 169,644 | 350,059 | 48% | 3720 | 45.38% | 18.53 |
| 117 | Sioux City, IA-NE-SD | 121,534 | 252,656 | 48% | 3437 | 39.92% | 39.51 |
| 4 | Burlington, VT-NY | 286,981 | 605,393 | 47% | 4686 | 39.36% | 57.62 |
| 47 | Lexington, KY-TN-VA-WV | 865,432 | 1,851,367 | 47% | 2229 | 39.30% | 80.39 |
| 72 | Paducah, KY-IL | 104,416 | 226,586 | 46% | 6137 | 36.16% | 70.02 |
| 108 | Wausau, WI | 220,454 | 487,723 | 45% | 2314 | 37.28% | 34.13 |
| 48 | Charleston, WV-KY-OH | 532,973 | 1,199,373 | 44% | 2323 | 37.88% | 85.35 |
| 54 | Erie, PA | 228,329 | 519,348 | 44% | 4049 | 38.67% | 116.41 |
| 105 | La Crosse, WI-MN | 106,090 | 241,903 | 44% | 4045 | 36.98% | 53.67 |
| 145 | Great Falls, MT | 73,428 | 166,564 | 44% | 4290 | 39.15% | 4.23 |
| 168 | Pendleton, OR-WA | 86,350 | 200,681 | 43% | 3327 | 38.00% | 8.67 |
| 52 | Wheeling, WV-OH | 136,660 | 327,645 | 42% | 4188 | 37.54% | 124.54 |
| 76 | Greenville, MS | 101,760 | 252,280 | 40% | 3411 | 39.54% | 40.96 |
| 58 | Northern Michigan, MI | 101,308 | 269,986 | 38% | 4563 | 44.38% | 28.53 |
| 129 | San Angelo, TX | 75,956 | 202,679 | 37% | 2871 | 42.11% | 10.05 |
| 114 | Aberdeen, SD | * | 82,608 | * | * | * | 5.39 |

* Data withheld to maintain firm confidentiality.

Source: Federal Communications Commission internal analysis based on preliminary year-end 2004 filings for Numbering Resource Utilization in the United States. Population based on 2000 Census. Density is persons per square mile.

**Table 4: Top 25 Mobile Telephone Operators by Subscribers
(in thousands)**

| Year-End 2003 | | | Year-End 2004 | |
|---------------|--------------------------|--------|--------------------------|--------|
| | Operator | Total | Operator | Total |
| 1 | Verizon Wireless | 37,522 | Cingular Wireless (2) | 49,109 |
| 2 | Cingular Wireless | 24,027 | Verizon Wireless | 43,816 |
| 3 | AT&T Wireless | 21,980 | Sprint PCS (3)(4) | 21,507 |
| 4 | Sprint PCS | 15,900 | T-Mobile | 17,314 |
| 5 | T-Mobile | 13,128 | Nextel (3) (5) | 16,247 |
| 6 | Nextel | 12,882 | ALLTEL (6) | 8,626 |
| 7 | ALLTEL | 8,023 | US Cellular | 4,945 |
| 8 | US Cellular | 4,409 | Dobson Comm. | 1,609 |
| 9 | Dobson Comm. | 1,552 | Nextel Partners | 1,602 |
| 10 | Leap Wireless | 1,473 | Leap | 1,569 |
| 11 | Western Wireless | 1,290 | MetroPCS (7) | 1,500 |
| 12 | Nextel Partners | 1,233 | Western Wireless (6) | 1,395 |
| 13 | Centennial (1) | 997 | Centennial (8) | 1,098 |
| 14 | MetroPCS | 977 | Triton PCS (now Suncom) | 951 |
| 15 | Triton PCS | 895 | Alamosa PCS (9) | 915 |
| 16 | Qwest | 871 | Qwest (10) | 754 |
| 17 | Rural Cellular | 746 | Rural Cellular | 730 |
| 18 | Alamosa PCS | 727 | Cincinnati Bell Wireless | 481 |
| 19 | US Unwired | 618 | US Unwired | 469 |
| 20 | Cincinnati Bell Wireless | 474 | Cellular South | 400 |
| 21 | Cellular South | 400 | AirGate PCS (9) | 400 |
| 22 | AirGate PCS | 360 | Midwest Wireless | 400 |
| 23 | Midwest Wireless | 350 | Ubiquitel | 497 |
| 24 | Ubiquitel | 328 | SouthernLINC | 260 |
| 25 | Southern LINC | 260 | iPCS (11) | 249 |

Sources: For 2003, *see Ninth Report*, at 20697. For 2004, publicly available company documents such as operators' news releases and filings made with the Securities and Exchange Commission. SouthernLINC, *Frequently Asked Questions* (visited June 15, 2005) <<http://www.solinc.com/faqs.asp>> (Southern LINC); Midwest Wireless, Company Facts (visited June 15, 2005) <<http://www.midwestwireless.com/Home/AboutUs/CompanyFacts.htm>> (Midwest Wireless); Rhonda Wickham, *Down Home In The Cellular South*, WIRELESSWEEK, Mar. 22, 2004 (Cellular South); MetroPCS, *MetroPCS Announces Signing of 1.5 Millionth Customer*, News Release, Feb. 28, 2005 (MetroPCS)

Notes

- (1) As of Nov. 30, 2003, includes Puerto Rico, the US Virgin Islands, and the Dominican Republic.
- (2) Cingular Wireless acquired AT&T Wireless in November 2004. *See* Section III.D.1, Sales and Swaps, *supra*.
- (3) On August 12, 2005, Sprint PCS completed its merger with Nextel. *See* Section III.D.1, Sales and Swaps, *supra*.
- (4) Includes retail (17.8 million) and wholesale (3.7 million) subscribers, including Virgin Mobile and Qwest.
- (5) Includes Nextel subsidiary Boost Mobile.
- (6) On August 1, 2005, ALLTEL completed its acquisition of Western Wireless. *See* Section III.D.1, Sales and Swaps, *supra*.
- (7) As of Feb. 28, 2005.
- (8) On Feb. 15, 2005, Alamosa completed its acquisition of AirGate PCS. *See* note 134, *supra*.
- (9) In the second quarter of 2004, existing Qwest subscribers began transitioning to Sprint PCS's network as Qwest exited the facilities-based provision of wireless service. . Sprint expected this transfer to be substantively complete by the end of the first quarter of 2005. Sprint, SEC Form 10K, filed Apr. 29, 2005, at 4. *See also Ninth Report*, at 20627-20628.
- (10) On July 1, 2005, iPCS completed its merger with Horizon PCS, another Sprint PCS affiliate. *See* note 134, *supra*. Horizon PCS reported 189,000 subscribers as of Dec. 31, 2004.

**Table 5: Estimated Mobile Telephone Rollouts
by County**

| Total Number of Providers in a County | Number of Counties | POPs Contained in Those Counties (1) | % of Total US POPs | Square Miles Contained in Those Counties | % of Total US Square Miles |
|---|-----------------------|--|-----------------------|---|----------------------------------|
| 3 or More | 2501 | 276,607,548 | 96.9% | 2,252,631 | 62.5% |
| 4 or More | 1994 | 265,843,377 | 93.2% | 1,741,091 | 48.3% |
| 5 or More | 1500 | 249,136,025 | 87.3% | 1,255,885 | 34.8% |
| 6 or More | 770 | 117,882,887 | 41.3% | 609,148 | 16.9% |
| 7 or More | 268 | 35,951,710 | 12.6% | 210,433 | 5.8% |

Source: Federal Communications Commission estimates based on publicly available information.

Notes:

- (1) POPs from the 2000 Census;
- (2) United States and Puerto Rico

Table 6: Mobile Telephone Digital Coverage

| Technology | POPs in Those Areas (1) | % of Total POPs (2) | Square Miles Contained in Those Counties | % of Total Square Miles |
|---------------|-------------------------|---------------------|--|-------------------------|
| CDMA | 279,966,795 | 98.1% | 3,017,538 | 83.7% |
| TDMA / GSM | 277,837,880 | 97.4% | 2,445,612 | 67.8% |
| iDEN | 262,564,508 | 92.0% | 1,707,650 | 47.3% |
| Total Digital | 284,904,797 | 99.8% | 3,211,352 | 89.0% |

Source: Federal Communications Commission estimates based on publicly available information.

Notes:

Broadband PCS and digital SMR licensees are analyzed by county; cellular licensees are analyzed by cellular market areas ("CMAs").

POPs from the 2000 Census.

Table 7: Change in CPI

| | CPI | | Cellular CPI | | All Telephone CPI | | Local Telephone CPI | | Long Distance Telephone CPI | |
|------------------|-------------|---------------|--------------|---------------|-------------------|---------------|---------------------|---------------|-----------------------------|---------------|
| | Index Value | Annual Change | Index Value | Annual Change | Index Value | Annual Change | Index Value | Annual Change | Index Value | Annual Change |
| Dec 1997 | 100 | | 100 | | 100 | | 100 | | 100 | |
| 1998 | 101.6 | | 95.1 | | 100.7 | | 101.6 | | 100.5 | |
| 1999 | 103.8 | 2.2% | 84.9 | -10.7% | 100.1 | -0.6% | 103.4 | 1.8% | 98.2 | -2.3% |
| 2000 | 107.3 | 3.4% | 76 | -10.5% | 98.5 | -1.6% | 107.7 | 4.1% | 91.8 | -6.5% |
| 2001 | 110.3 | 2.8% | 68.1 | -10.4% | 99.3 | 0.8% | 113.3 | 5.2% | 88.8 | -3.3% |
| 2002 | 112.1 | 1.6% | 67.4 | -1.0% | 99.7 | 0.4% | 118.5 | 4.5% | 84.9 | -4.4% |
| 2003 | 114.6 | 2.3% | 66.8 | -0.9% | 98.3 | -1.4% | 123.3 | 4.1% | 77.8 | -8.4% |
| 2004 | 117.7 | 2.7% | 66.2 | -0.9% | 95.8 | -2.5% | 125.1 | 1.5% | 70.9 | -8.9% |
| Dec 1997 to 2004 | | 17.7% | | -33.8% | | -4.2% | | 25.1% | | -29.1% |

Source: Bureau of Labor Statistics.

Table 8: Average Revenue Per Minute

| | Average Local Monthly Bill | Minutes of Use Per Month | Average Revenue Per Minute | Annual Change |
|------|----------------------------|--------------------------|----------------------------|---------------|
| 1993 | \$61.49 | 140 | \$0.44 | |
| 1994 | \$56.21 | 119 | \$0.47 | 8% |
| 1995 | \$51.00 | 119 | \$0.43 | -9% |
| 1996 | \$47.70 | 125 | \$0.38 | -11% |
| 1997 | \$42.78 | 117 | \$0.37 | -4% |
| 1998 | \$39.43 | 136 | \$0.29 | -21% |
| 1999 | \$41.24 | 185 | \$0.22 | -23% |
| 2000 | \$45.27 | 255 | \$0.18 | -20% |
| 2001 | \$47.37 | 380 | \$0.12 | -30% |
| 2002 | \$48.40 | 427 | \$0.11 | -9% |
| 2003 | \$49.91 | 507 | \$0.10 | -13% |
| 2004 | \$50.64 | 584 | \$0.09 | -12% |

Note: Data covers the last six months of each year.

Source: See Appendix A, Table 1, at A-2 (ARPU); Dec 2004 CTIA Survey, at 219 (minutes of use).

Table 9: Market Entry Over Time

| Total Number of Providers in a County | Percent of Total US POPs Covered | | | | | |
|---------------------------------------|----------------------------------|--------------|---------------|----------------|--------------|--------------|
| | Tenth Report | Ninth Report | Eighth Report | Seventh Report | Sixth Report | Fifth Report |
| 3 or more | 96.9% | 96.8% | 94.7% | 94.1% | 90.8% | 87.8% |
| 4 or more | 93.2% | 93.0% | 89.3% | 88.7% | 84.4% | 79.8% |
| 5 or more | 87.3% | 87.5% | 82.6% | 80.4% | 75.1% | 68.5% |
| 6 or more | 41.3% | 75.8% | 71.1% | 53.1% | 46.7% | 34.6% |
| 7 or more | 12.6% | 29.5% | 25.4% | 21.2% | 11.9% | 4.4% |

Source: FCC estimates

**Table 10: Mobile Market Structure and Performance
in Selected Countries**

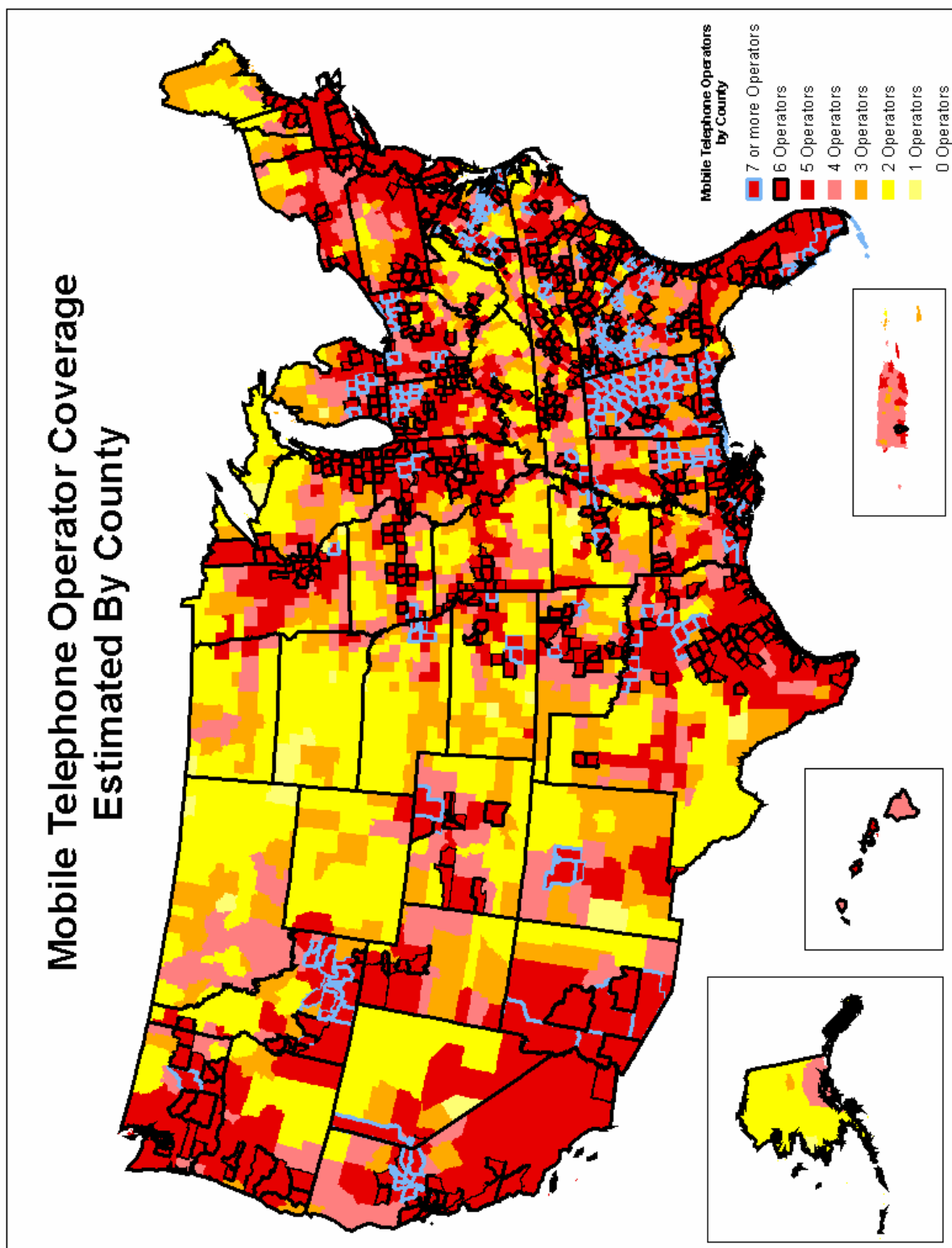
| Country | Number of Players | Penetration (%) | MOUs | Revenue per Minute (\$) | Data (% of ARPU) |
|---------------------------|----------------------|-----------------|------|----------------------------|---------------------|
| Mobile Party Pays | | | | | |
| USA | 5+ | 61 | 630 | 0.08 | 6 |
| Canada | 3 | 47 | 359 | 0.11 | 7 |
| Hong Kong | 6 | 106 | 387 | 0.06 | 9 |
| Singapore | 3 | 90 | 282 | 0.10 | 18 |
| Calling Party Pays | | | | | |
| UK | 5 | 104 | 151 | 0.22 | 20 |
| Germany | 4 | 87 | 76 | 0.35 | 18 |
| Italy | 4 | 110 | 120 | 0.26 | 14 |
| France | 3 | 74 | 225 | 0.17 | 13 |
| Spain | 3 | 99 | 135 | 0.27 | 13 |
| Finland | 3 | 95 | 258 | 0.16 | 13 |
| Japan | 3+ | 71 | 154 | 0.32 | 24 |
| South Korea | 3 | 76 | 316 | 0.10 | 17 |
| Australia | 4 | 89 | 168 | 0.21 | 13 |

Sources: Glen Campbell *et al.*, *Global Wireless Matrix 4Q04*, Global Securities Research & Economics Group, Merrill Lynch, Apr. 13, 2005. The reason for distinguishing countries that use calling party pays (“CPP”) from those that use mobile party pays is that CPP may contribute to higher mobile penetration, lower usage, and higher revenue per minute in CPP countries. *See* Section VI.D, International Comparisons, *supra*.

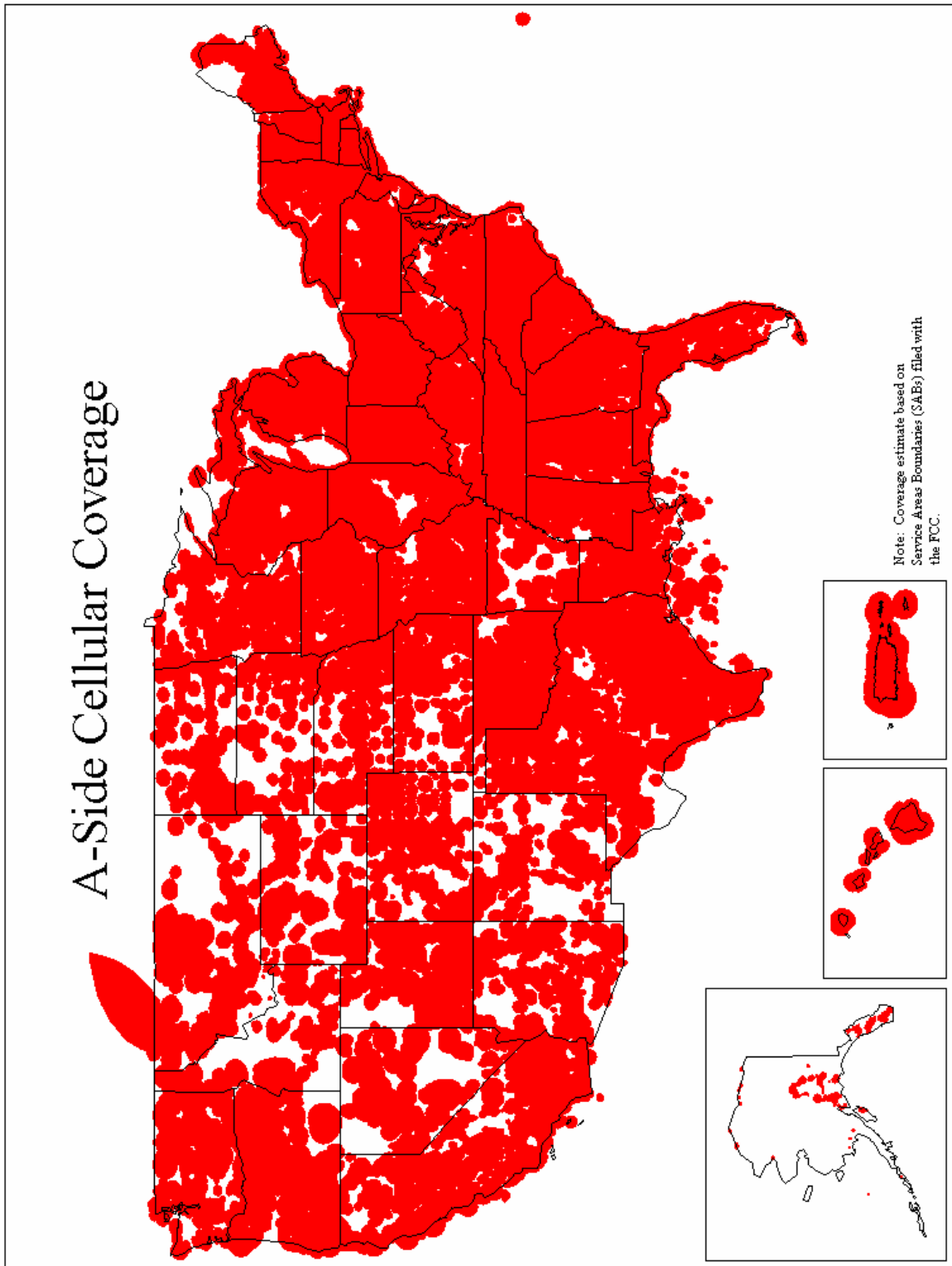
APPENDIX B**Maps****Table of Contents**

| | |
|---|-----|
| Map 1: Mobile Telephone Operator Coverage Estimated by County..... | 91 |
| Map 2: A-Side Cellular Coverage | 92 |
| Map 3: B-Side Cellular Coverage..... | 93 |
| Map 4: Mobile Telephone Penetration Estimated by Economic Area..... | 94 |
| Map 5: Estimated Rollout with Any Digital Coverage..... | 95 |
| Map 6: Estimated Rollout with CDMA-Based Coverage..... | 96 |
| Map 7: Estimated Rollout with TDMA/GSM-Based Coverage | 97 |
| Map 8: Estimated Rollout with iDEN-Based Coverage | 98 |
| Map 9: Estimated Rollout of Next Generation Networks..... | 99 |
| Table 1: Geographic Licensing Schemes..... | 100 |
| Map 10: Basic Trading Areas | 101 |
| Map 11: Major Trading Areas | 102 |
| Map 12: Cellular Market Areas | 103 |
| Map 13: Economic Areas | 104 |

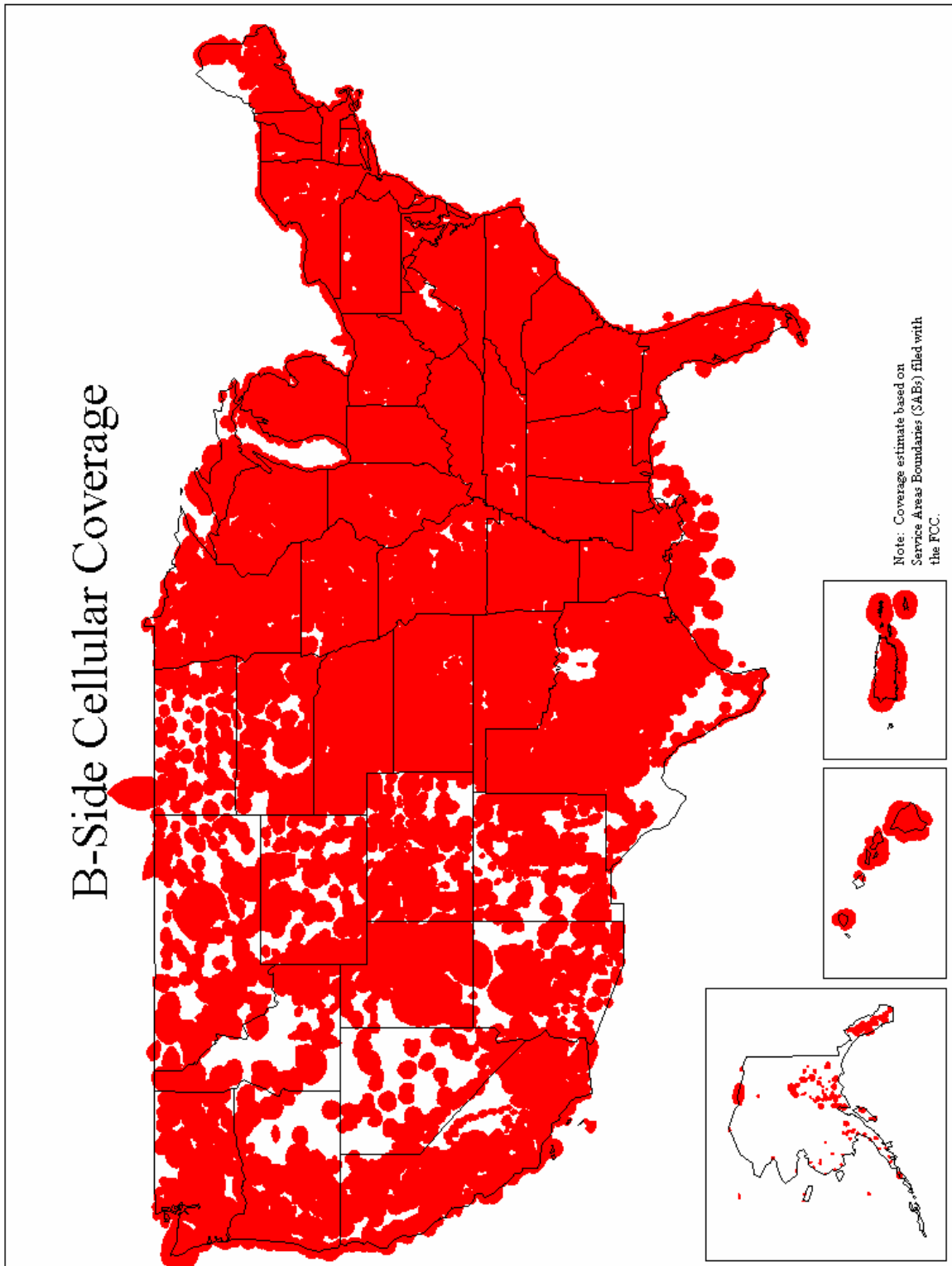
Map 1



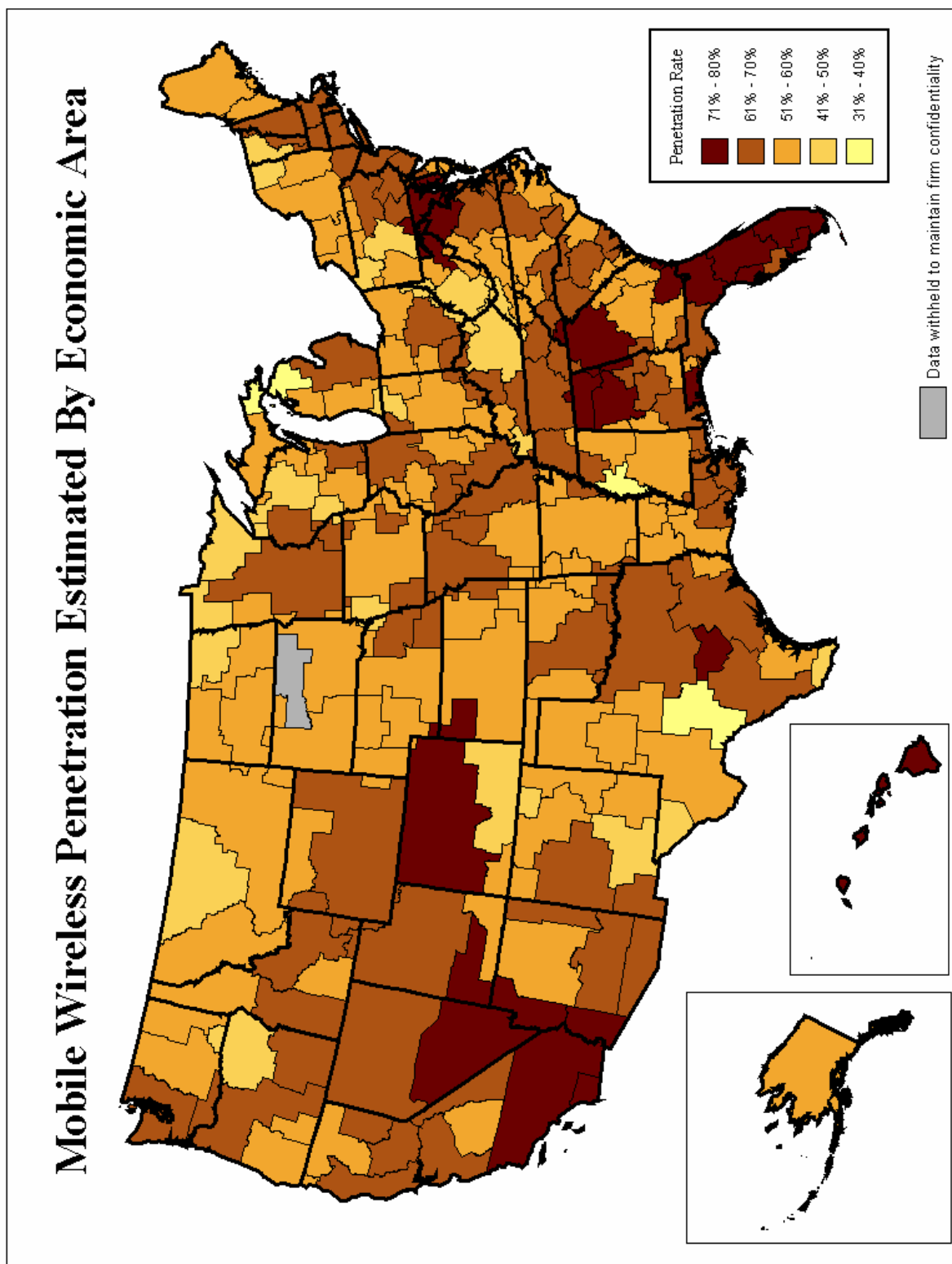
Map 2



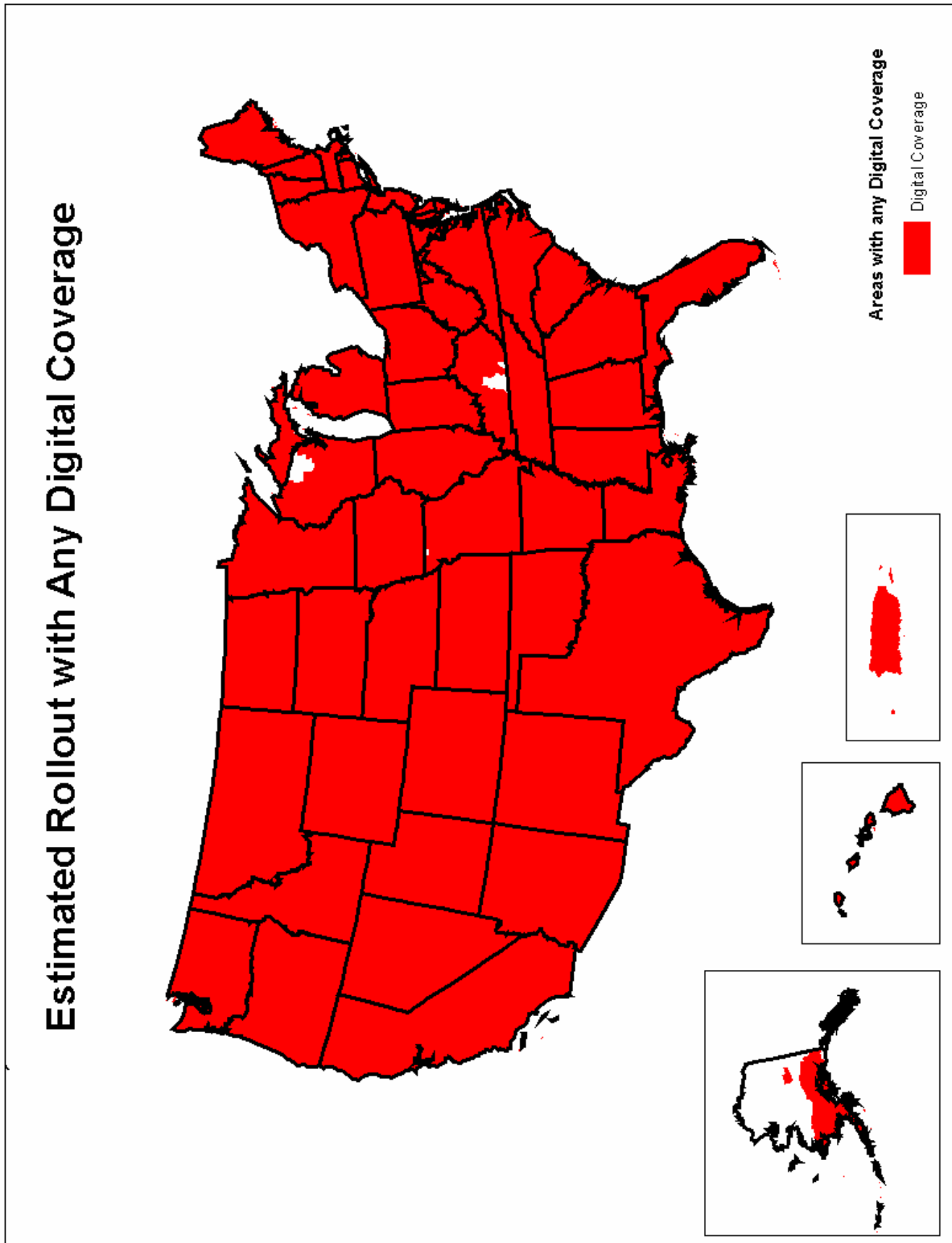
Map 3



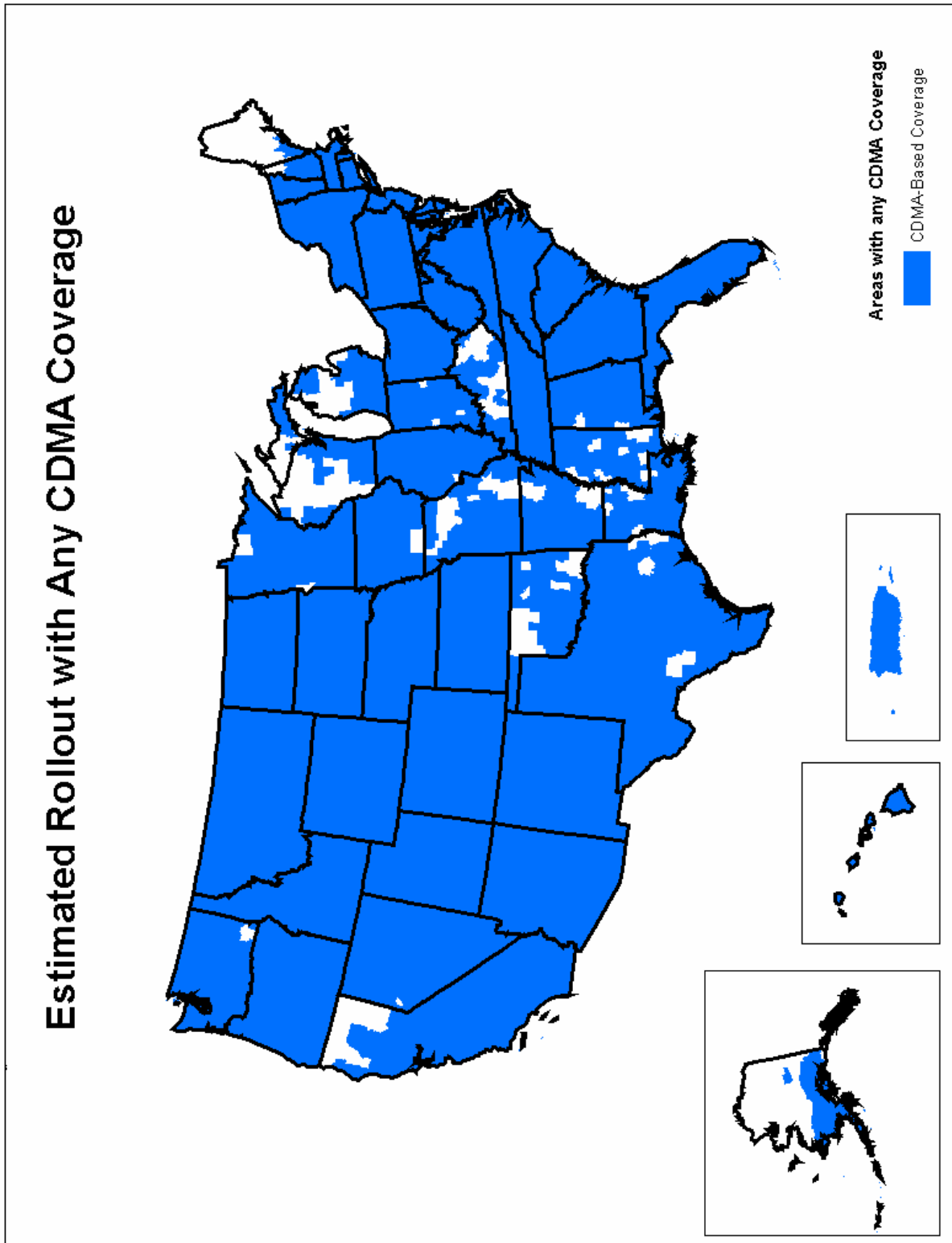
Map 4



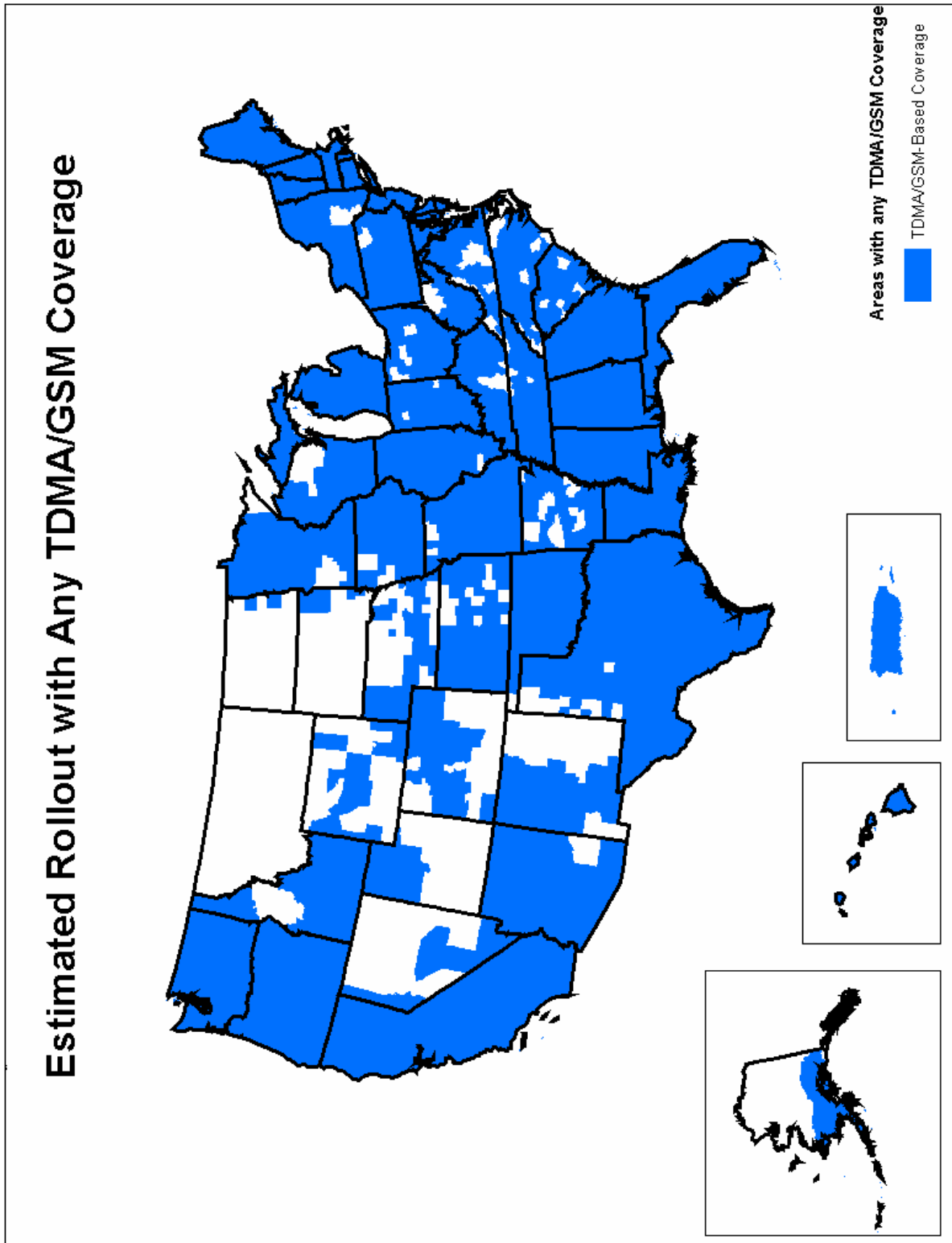
Map 5



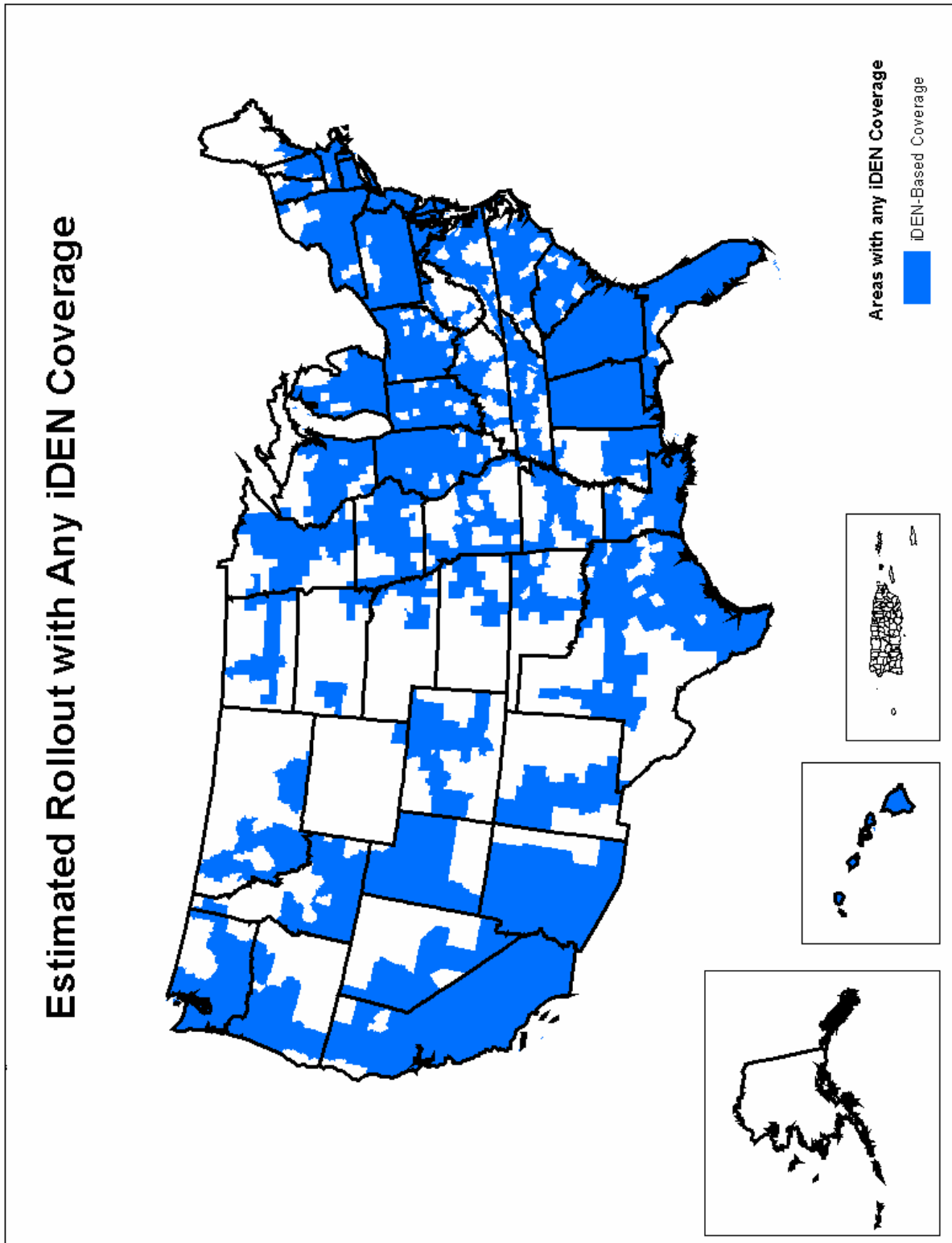
Map 6



Map 7



Map 8



Map 9

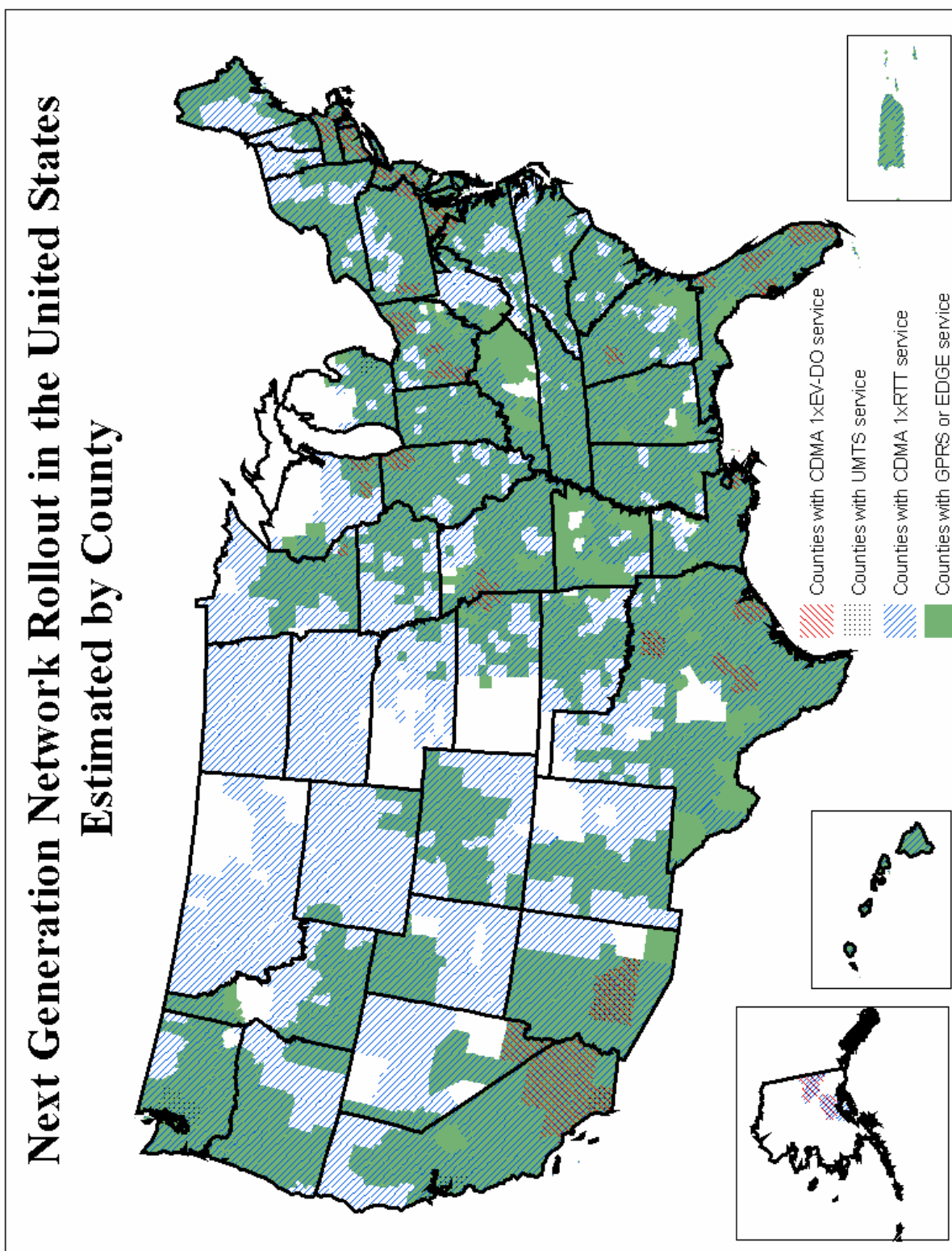
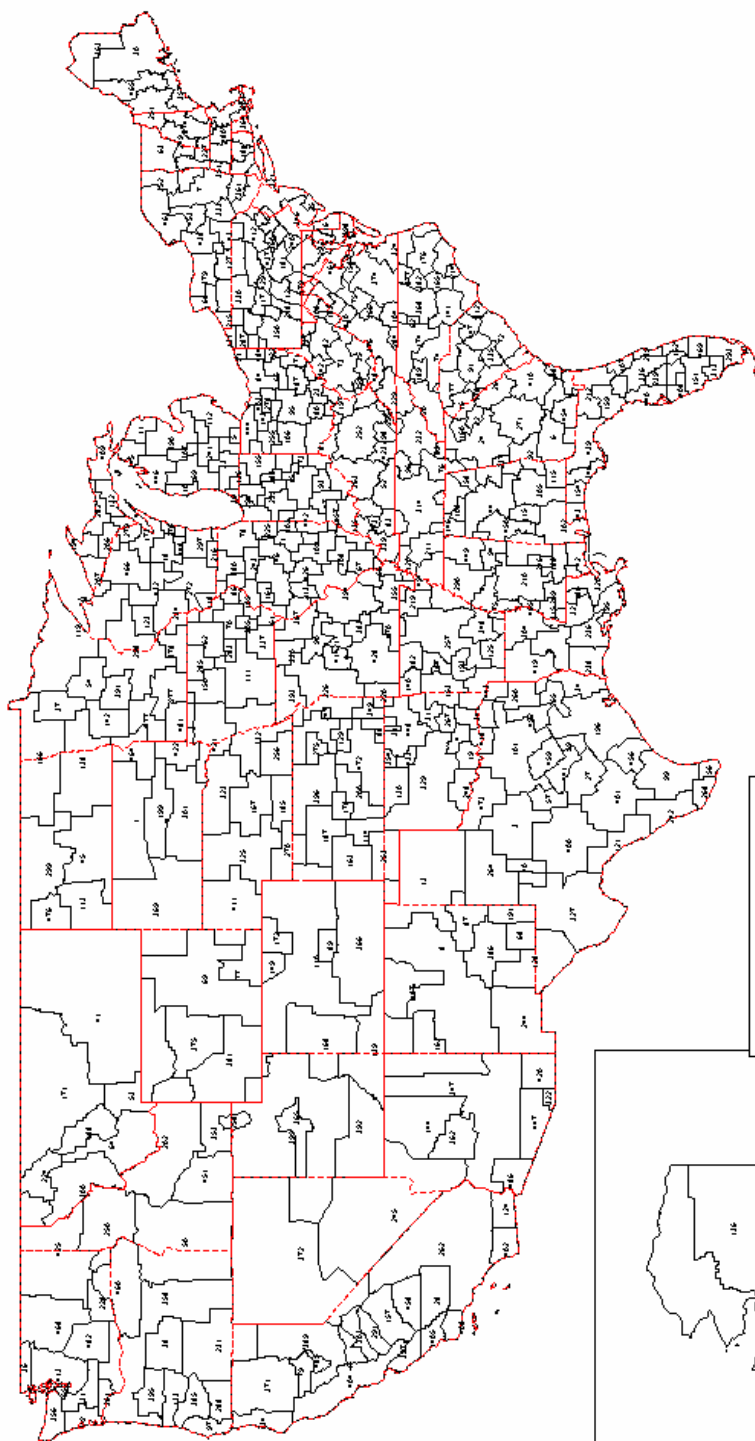


Table 1: Geographic Licensing Schemes

| Geographic Licensing Schemes | Number of Market Areas | Note |
|-------------------------------------|------------------------|------------------------------------|
| Basic Trading Areas (BTAs) | 493 | BTAs make up MTAs |
| Major Trading Areas (MTAs) | 51 | |
| Cellular Market Areas (CMAs) | 734 | Also known as MSAs and RSAs |
| Economic Areas (EAs) | 175 | |

Map 10

The 493 Basic Trading Areas (BTAs)



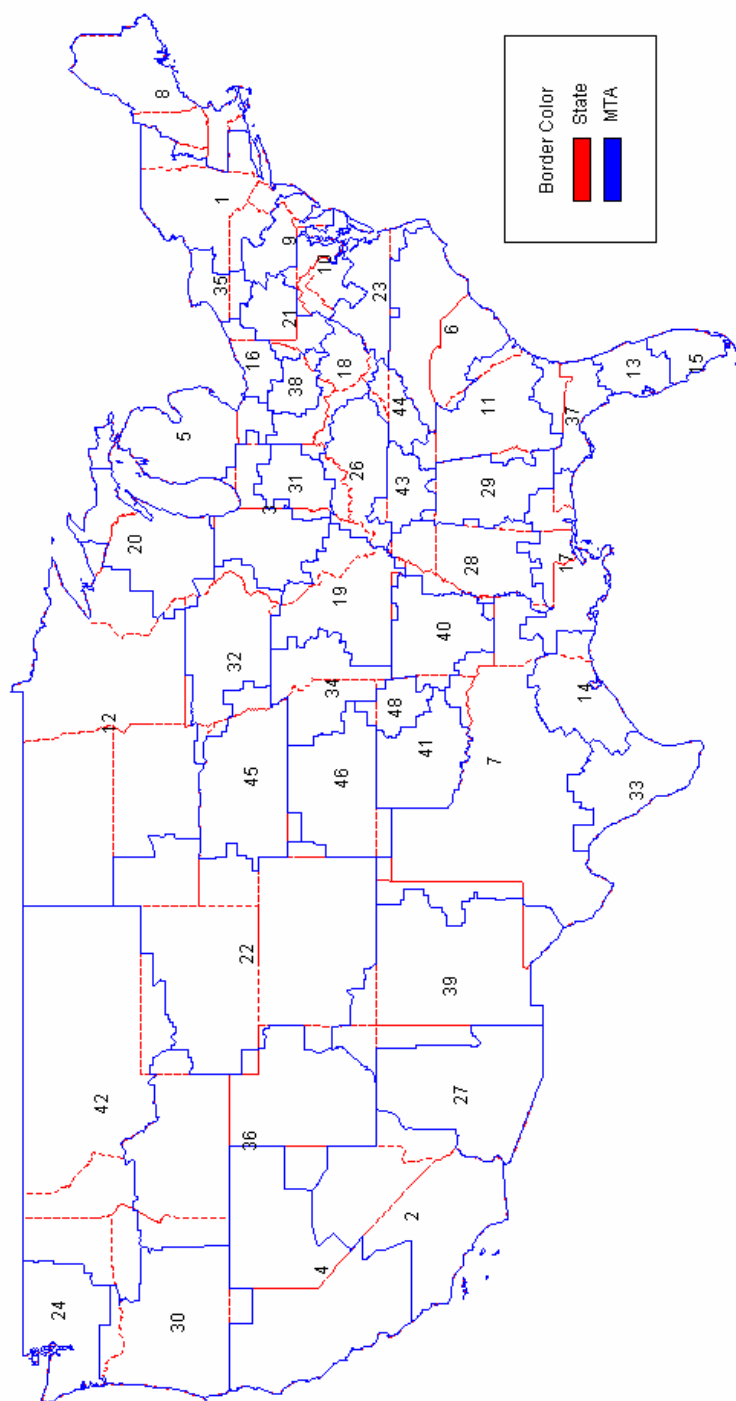
BTA-Like areas not shown:

- B488 San Juan, PR
- B489 Mayaguez, PR
- B490 Guam
- B491 US Virgin Islands
- B492 American Samoa
- B493 Northern Mariana Islands

Based on Material Copyright (c) 1992
Rand McNally & Company. Rights granted
pursuant to a license from Rand McNally &
Company through an arrangement with
The Personal Communications Industry
Association.

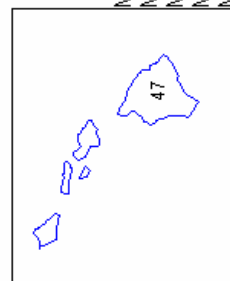
Map 11

The 51 Major Trading Areas (MTAs)



Based on Material Copyright (c) 1992
Rand McNally & Company. Rights granted
pursuant to a license from Rand McNally &
Company through an arrangement with
The Personal Communications Industry
Association.

MTA-Like areas not shown:
M25 Puerto Rico & US Virgin Islands
M49 Alaska
M50 Guam and Northern Mariana Islands
M51 American Samoa

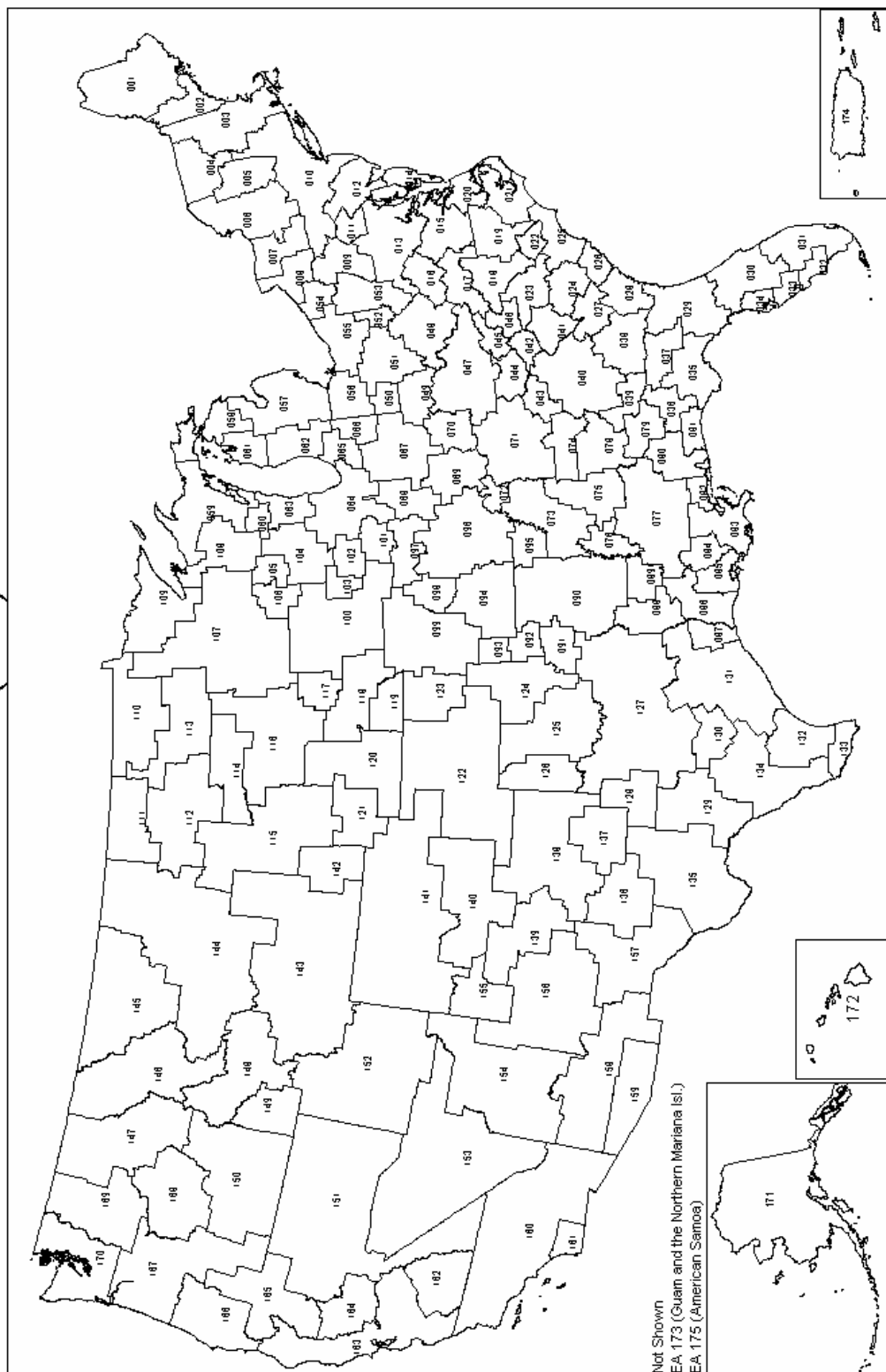


Cellular Market Areas



Map 13

Economic Areas (EAs)



EAs delineated by the Regional Economic Analysis Division
Bureau of Economic Analysis, U.S. Department of Commerce
January 1995

APPENDIX C**List of Commenters**Comments

CTIA-The Wireless Association

TracFone Wireless, Inc.

Leaco Rural Telephone Cooperative, Inc. (Bennet & Bennet)

Public Service Communications (Bennet & Bennet)

Artic Slope Telephone Association Cooperative, Inc. (Bennet & Bennet)

Mid-Tex Cellular, Ltd. (Bennet & Bennet)

Great Lakes of Iowa, Inc. (Bennet & Bennet)

National Telecommunications Cooperative Association

Replies to Comments

Dobson Communications Corporation

Leap Wireless International, Inc.

T-Mobile of USA, Inc.

Virgin Mobile USA, LLC

SouthernLINC Wireless

**CONCURRING STATEMENT OF
COMMISSIONER MICHAEL J. COPPS**

RE: Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services.

This is the tenth year we have issued a Report on wireless competition in America. I am pleased that the quality of these reports is improving—as, for example, in the competition analysis that we conduct. But we’re not all the way there yet, and I concur because of arguments and omissions that continue to concern me.

In requiring these Reports, Congress tasked us with doing an “analysis of whether or not there is effective competition” in commercial mobile services. Yet we still fail to define “effective competition” – and this limits the ability of the Commission and the Congress to rely on our results. I also remain troubled by our inability truly to assess coverage for rural communities. The Report states that ninety-seven percent of Americans live in counties with three or more competitors—but that does not mean that all residents of a county actually have access to three or more competitors. It could mean—and we lack the data to know—that access is focused along a highway that cuts through a county. Going forward, the Commission needs to look for additional data sources so that we can more accurately assess rural coverage in future Reports.

The Report further claims that consumers do not face difficulties obtaining the information they need. Why then do we continue to receive consumer complaints about wireless services, including complaints about confusing wireless bills, hidden and expensive fees, and service maps that do not adequately allow consumers to determine where they will get service?

Notwithstanding the concerns I have expressed, we should recognize that the Report shows that more consumers have mobile phones than ever before and consumers benefit as carriers introduce innovative offerings and pricing plans and roll out new services. It is because of the growing importance of these technologies and services that the Commission needs to do the best possible job of studying and monitoring developments. Increasing consolidation in the industry also argues in favor of making sure that improvements continue and that we avoid problems that could harm consumers and competition.